Engineering News, November 2, 1961

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ENGINEERING NEWS

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'City is ready to back £300 million scheme'

LONDON AIRPORT MAY BE MOVED TO THE COAST

200 mph monorail would provide link with capital

Engineering News Exclusive

ENGINEERS and surveyors are at work choosing a site on the Essex coast to replace London Airport. Included in the plan is a possible 200 m.p.h. monorail link with London. Financial backing has been "promised" by men in the City. A decision is expected within a "few weeks."

Carrying out the scheme for the new airport would bring important orders to the steel industry, to the construction companies, to whichever firms were chosen to equip the monorail, and to the many other engineering concerns.

Four times the size

The new airport would be four times the size of London Airport. The Heathrow site would be redeveloped.

Heading the scheme is Mr. John Connell, businessman and honorary secretary of the Noise Abatement Society.

Mr. Connell told Engineering News that "London Airport is just not big enough for the traffic that goes through it. And noise complaints from nearby residents are always being made.

"It is no good just moving the noise nuisance somewhere else. The coast is the obvious answer and we have engineers and surveyors looking at a number of possible places on the Essex coast."

Communications between the coastal airport, part of which might project into the sea, and London would be by one of two forms: "We might build a tube. Much higher speeds of tunnel building are possible with modern machinery than is generally realised.

"The alternative, which I rather favour, is a monorail, reaching speeds of between 150 and 200 m.p.h. If residents objected to the coaches going along more or less at bedroom window level it might be necessary to go underground in London."

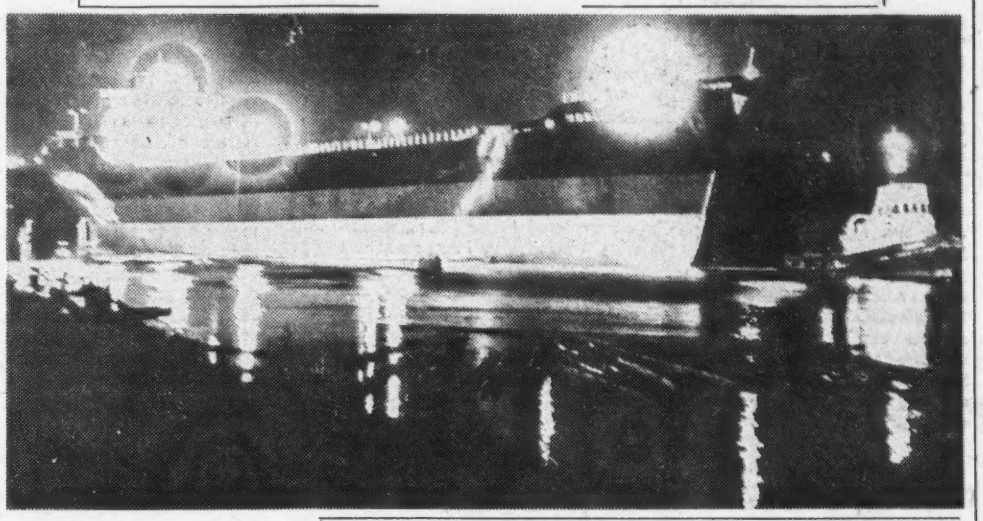
Private enterprise

The financial likelihood of the scheme has been carefully investigated by Mr. Connell. On this point he says: "I have been told in the City we could get financial backing. It would have to be a private enterprise job and could be built in up to 12 months.

"The money involved in the scheme would be about £240 to £300 million. This would include the redevelopment of the London Airport site for housing, open spaces and light industries."

The Noise Abatement Society, which operates from 6, Old Bond St., London, W.1., will place its scheme before the Ministry of Aviation, and the plan may be raised in the House of Commons.

AFTER-DARK LAUNCHING SAVES MONTH DELAY



THIRD time lucky—that's the story behind the launching of the 20,300 ton World Explorer in Sunderland by Short Brothers.

On two consecutive days the launching was postponed because high tide on the River Wear was below level.

But the berth was in demand and Short's decided to launch her during the early morning of the third day. Missing the high tides would also have meant a month's delay.

Half-an-hour before the launching a gale blew up but at 4 a.m. the river was calm. Mrs. Henry Short launched the ship, which is 561 feet long, and 71ft. 9in. broad. Picture by courtesy of Sunderland Echo.

AUTOMATIC UNIT SELECTS GOODS

AN electronically controlled automatic warehouse system which could revolutionise the selection of goods and assembly of orders has completed trials at the Brough factory of Blackburn Electronics Ltd. The system has been devised by the company in association with Armstrong Whitworth Equipment.

The equipment consists of overhead gravity-fed line storage bins from which goods are fed on to a conveyor belt for transmission to a packing area.

Up to five items a second can be released on to the conveyor. The gate to each bin is operated by a relay controlled by a central console.

Three way system

Selection of items required to fill a given order is by means of punched card or manual switching.

The system may be operated in three ways — manual, semi and fully automatic.

In the event of any storage bin becoming empty, the system automatically indicates that the item is "out of stock".

As the items are dispensed from the bins an invoice is printed.

Britain seeks fuel cell lead

RESEARCH into fuel cell development is to be carried on by a new company backed by three well-known British firms, the Guest, Keen and Nettlefold group, British Ropes, and British Petroleum.

The direction of at least the early stages of the work will be towards large stationary power sources, such as a power station.

The three firms have combined with the National Research Development Corporation, which has been supporting fuel cell research in Britain for some years, and all four have an equal interest in the new concern — Energy Conversion Ltd.

World competition

Fuel cells, in which electricity is generated directly from chemical energy, have been demonstrated in Britain but no commercial version has yet been produced.

Other U.K., Scandinavian, Soviet and West German concerns are also working on fuel cells but it is believed that work in the U.S. is the most advanced.

The British NRDC has two-way agreements with U.S. firms on patents and technical information. These benefits will now go to Energy Conversion.

Participation by British Petroleum in the scheme suggests that the company anticipates the

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U.S. develop impact tester with camera

AN automatically tripped camera which records deformations of a workpiece in an impact testing machine has been developed by W. E. Wolstenholme of the U.S. Rubber Co.

The makers describe this as an autographic tester which takes a photograph showing how samples respond to the striking blow.

It is of particular use in plastics where, for example, a dental plate or football helmet must be made of a material that yields slowly and easily. Plastic pipe and gears, however, need high strength with a minimum of distortion.

The apparatus features a device which translates the mechanical energy into electrical impulses, an oscilloscope to register the impulses in the form of a tracing or graph, and a camera to take a picture of the graph.

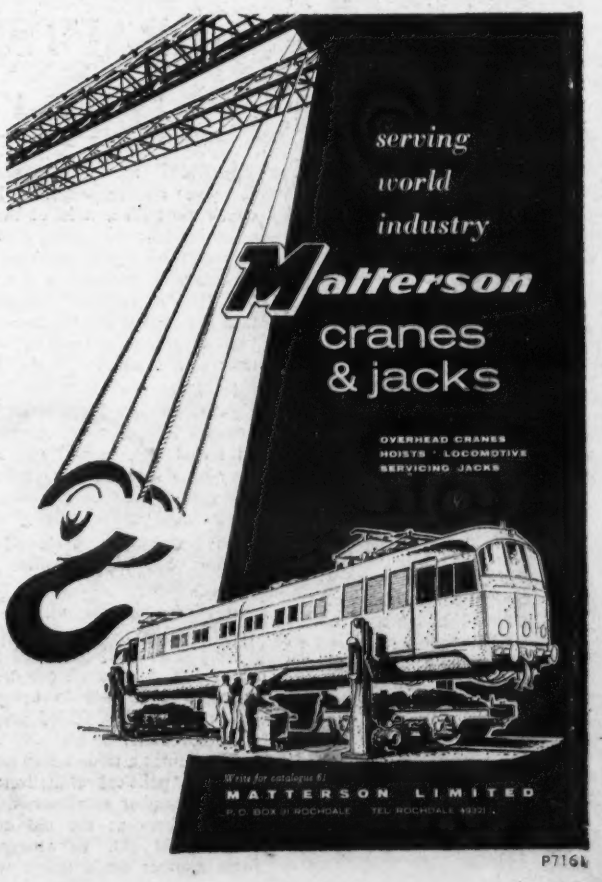
Ninth factory exhibition

OVER 350 firms will be displaying equipment and machinery at the 9th International Factory Equipment Exhibition to be opened at Earls Court, London, on November 13 by Dr. Richard Beeching, chairman of the British Transport Commission.

The exhibits will be grouped into 14 sections to allow visitors to compare equipment easily.

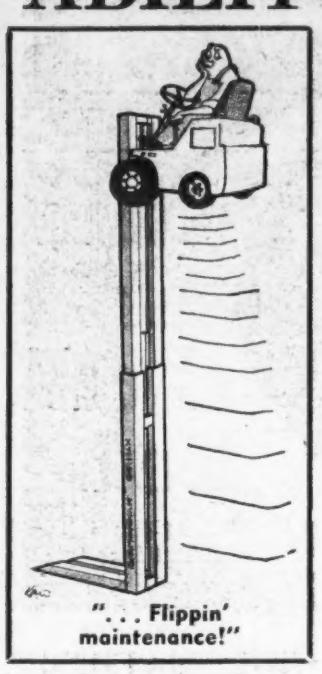
GUARD CHANGE

ALL the personnel on the engineering side involved with the design and manufacture of Rubery, Owen press-brake guards have been transferred to Boucher & Co. Ltd., Pike Mills, New Road, Kidderminster. Manufacture, erection and servicing of the guards will now be carried out by this company.



Letters to the Editor

ABILITY REWARDED?



Directors do not know workers' capacity

I would submit that the article "Ability Is Gaining Its Just Reward" (October 19), should bear the title " . . . not gaining . . . .", as many experienced readers and members of professional institutions will aver.

They are, for the most part, in a good position to correct any faults of policy, design, or administration, from everyday contact (or conflict as may be) but this without friction.

But they have no authority from their superiors and directors, who in their turn too often do not know of the latent capacity of their men, which is not being put to good and proper use.

In some firms today, modification and rectification (remake at times) is lost sight of in the aggregate costs of a given project, for reasons above, plus the ever-present modicum of restrictive practices—seen and unseen.

This is in great contrast to other firms who practise merit rating throughout the organisation, for mutual benefit. There never was such a time for payment by results—operators, craftsmen, supervisors and directors alike, and for consideration of co-partnership, which, in day to day and long term decisions rightly taken and acted upon, could not fail to lift production into real prosperity.

Finally, Mr. Macmillan's remark recently that the average man's wage should soon be £1,000 a year could have been better expressed today in that the average man should earn £1,000 a year—a very necessary and quite different point of view.

M.I.P.E.

(Name and address supplied)

INEFFICIENT EFFICIENCY

Mr. Minton (October 26) rightly draws attention to anomalies in percentage bases. May I quote another example — a common offender in the sphere of inspecting and testing.

A stipulated efficiency of say 75 per cent is "subject to a tolerance of 2 per cent". Does that mean a permissible figure of 73 per cent or 73½ per cent?

R. B. FAIRTHORNE, M.I.Mech.E., M.I.E.E.

1 Birdgage Walk,
Westminster,
London, S.W.1.

A thought for small workshops

WITH reference to your new publication, could you possibly spare a little space for items of interest to the small isolated workshops, of which there are many attached to laboratories and hospitals throughout the country.

These are mostly working for scientific staff, and have very limited resources, but are expected to perform miracles at the shortest possible notice.

The chief difficulties experienced are: the difficulty of achieving a well designed appearance and finish to work by non-production methods; and of obtaining small quantities of materials and components.

The staffs of these workshops are expected to be fitters, machinists, electricians, instrument mechanics, draughtsmen, designers, carpenters, and glassblowers, and are liable to have to work with almost the whole range of materials available.

A considerable amount of development work and prototype construction is carried out in these workshops under extreme difficulties, and many machines, methods, and materials have had their origins in them.

So far as I am aware no technical publication has ever been aware of their problems or for that matter of their existence, and if you could pay them some small attention it would be much appreciated.

D. T. HEMSLEY

Technical Services Division,
Laboratory of the Government Chemist,
Strand, London, W.C.2.

LET'S BE FAIR TO THESE MEN

THE remarks in your Engineer's Diary of October 19 hardly do justice to the practical efforts made by the British engineering industry in removing hydrogen from metals.

You yourselves featured an article in your issue of October 12 on vacuum melting, depicting plant used at Jessop-Saville, which effects, among other things, the removal of hydrogen from steel.

G. L. Willan, Imperial Chemical Industries, and Telcon Metals also operate commercial plants for vacuum melting and casting and, despite the fact that operating skills and knowledge have considerable commercial value, all these companies described their equipment and discussed methods of operation at the Vacuum Melting Symposium held earlier this year.

This symposium was arranged by the Institution of Mechanical Engineers and sponsored by the Joint British Committee on Vacuum Science and Technology.

The recent BISRA conference dealing with the influence of hydrogen on steel properties forms, in fact, a useful counterpart to some of the topics discussed at this previous conference.

Some of the vacuum melting equipment used in Great Britain is of foreign manufacture, though in our case at least, all the equipment is exclusively British made.

Incidentally, vacuum melted steel is supplied to, and used by, most, if not all of the contributors to whose papers reference is also made in your issue of October 19, and our co-operation with some of these contributors has been a great help to us in applying this manufacturing technique.

B. H. C. WATERS, Research Manager.

Telcon Metals,
Crawley,
Sussex.

CRAFTSMEN NEVER HAD IT SO BAD!

PERMIT me to congratulate you on Engineering News which must fill a need of the engineering industry. I would like to comment on the remarks of Mr. Mossdale re toolmakers (October 26). The fact is that highly-skilled men have never had the remuneration or status in industry which their skill demands.

In December 1948 the *Daily Express* published the result of a survey. Skilled men interviewed all stated they would not allow their sons to enter the workshops because of the poor status of craftsmen.

The sons too preferred the cleaner jobs in the office with better status.

A survey carried out the previous year by the Institute of Engineers (Practical) produced similar results. As a result our organisation was formed to bring together all really skilled men to work for better status.

We are not a trade union nor do we have political affiliations. In fact we number employers among our members as the old craftsmen's guild did. To attempt to form another trade union would be heading for trouble from existing unions. It would most likely become political to the left while most employers associations have political leanings to the right. The two would start by being opposed.

Most skilled men these days have some technical qualifications, it should not be very difficult to lay down broad standards of craft and technical ability to promote the best men to staff "technician" grade with monthly salaries and staff conditions.

There is no shortage of skill in Britain but the remuneration and status have made it better for men with skill to play about with pieces of paper in offices and satisfy their desire to produce excellent work in the various model engineering societies which abound.

A good many of these would be interested to return to the workshops with a monthly salary and full staff status. If industry is short of the skilled people it needs then industry is itself to blame.

A. L. JACKSON, A.M.S.E. Secretary.

Institute of Engineers (Practical),
118 Westwood Park,
London, S.E.23.

LAST WORDS ON LEAD SCREWS

It states in this autobiography...

IN his autobiography (edited by Samuel Smiles, 1885), James Nasmyth states that his first job, on entering Mr. Maudslay's works, on May 30, 1829, was to "assist him (Maudslay) in making some modifications in the details of a machine which he had contrived some years before for generating original screws.

"It consisted in the employment of a knife-edged hardened steel instrument, so arranged as to be set at any required angle, and its edge caused to penetrate the surface of a cylindrical bar of soft steel or brass.

This being revolved under the incisive action of the angularly placed knife-edged instrument, it thus received a continuous sprial groove cut into its surface .

"The spiral groove was deepened to the required extent by a suitable and pointed hard steel tool firmly held in the jaws of an adjustable slide made for the purpose, as part and parcel of the bed of the machine.

"And in order to produce or generate right hand or left hand screws, all that was necessary was to set the knife-edged instrument to the right or left hand inclination in respect to the axis of the cylindrical bar at the outset of the operation.

"This beautiful and truly original contrivance became, in the hands of its inventor, the parent of a vast progeny of perfect screws, whose descendents, whether legitimate or not, are to be found in every workshop throughout the world, wherever first-class machinery is constructed."

T. C. ANGUS

Clavering,
Essex.

MAUDSLAY FIRST SUCCESS?

FURTHER to the letter from Mr. W. Mannheim (October 5) and subsequent letters, I believe the first man to make a practical and commercial success of the screw-cutting centre lathe was Henry Maudslay.

His first machine made in 1797 could only cut threads of the same T.P.I. as the lead-screw. The second effort in 1800 had change wheels.

The 1797 machine had several leadscrews of different T.P.I. and these were probably hand cut although after a short length and a nut was made, it is possible that the thread was extended using a tool mounted on the nut to cut ahead of it.

Both these machines are in the Science Museum and this authority advised me to consult "English and American Machine Tool Builders" by Joseph Wickham Roe, 1916, and a paper by the same author in the Proceedings of the Newcomer Society Vol. XVII.

J. F. TADMAN

16 Ladbroke Gardens,
Mackworth Estate,
Derby.

SOMEWHERE IN FRANCE

READING Mr. Wood's letter (October 19) regarding the cutting by hand of a lathe lead screw about 120 years ago, reminds me of an incident in a Service workshop in France about 4 years ago, during the 1914/18 War.

To carry out urgent modifications to aero engines in preparation for a raid on Germany, it was necessary to cut a number of metric threads and only one lathe had the required 127 tooth gear wheel.

It was decided to make a further wheel, using the existing one as a former.

This was done by passing a shaft through the hollow headstock of the lathe and the chuck jaws with the gear blank to be cut, keyed to one end of the shaft and the former to the other.

A spring catch was inserted in one tooth of the former wheel so that the gear blank could be accurately rotated one tooth pitch at a time.

A lathe tool carefully ground to the gear tooth profile was fixed sideways in the lathe slide rest, so that by hand a cut could be taken across the face of the gear blank, the depth of the cut being controlled by the forward movement of the slide rest.

A number of mechanics took turns in sliding the tool to and fro, and developed blisters on their hands in doing so: the resultant gear wheel was quite efficient in operation.

F. P. ASHLEY, M.I.Mech.E.

Tintagel,
Oathill Road,
Haywards Heath,
Sussex.

It's all done by wires

REGARDING the correspondence as to the method of producing the first lead screw, I have always, since the days of my apprenticeship 50 years ago, understood that the procedure was to wrap two square section wires side by side around the spindle and to braze them on. One of the wires was then removed leaving a reasonably accurate square threaded screw.

R. ALLAN BROWN,

176 Court Lane, Dulwich, London, S.E.21.

Correspondence on lathe lead screws is now closed.—Ed.

Here's one way of cutting those extra taxes!

I READ with interest Mr. Willmott's letter about the need to cut government expenditure (October 26).

We are continually having extra taxes added when at the same time both industry and labour are told to restrict dividends and wages.

The government is still continuing the subsidy to the railways. They cost us £245 million last year, and probably £300 million in this current year. If the railway lines and wagons were replaced by concrete roads and rubber tyred vehicles, i.e. coaches and lorries, this enormous loss would be eliminated.

The 12,000 miles of railway route (excluding all single line routes) would be a great addition to our present total of 8,500 miles of trunk roads. All goods and coach traffic could operate on these converted roadways so freeing our existing roads.

I understand that the coach fare from Victoria station to Birmingham is half that of British Railways and therefore lorries and coaches would operate at half the price of railways so reducing the transport charges to industry.

Few people know that the British Railways only do six times as much business as the B.T.C.'s road haulage fleet of 16,000 vehicles. The railways already have 16,000 vehicles, so that a further 80,000 vehicles would cope with all the railway freight.

When you consider that there are over 400,000 heavy vehicles in use in this country, you will realise what an insignificant job the railways are doing and are certainly no help to industry.

What the Government should do, when carrying out their railway modernisation plans is to convert a section of railway route into a roadway and from that we could prove or disprove its practibility as a roadway.

One such route is the central line from Marylebone Sheffield and then on to

This last section is already of use and the remainder nearly so. It has already decided to stop passenger from Aylesbury to Sheffield that there is very little left line to do.

The commuted traffic London could if necessary carried either alongside the road or underneath it.

S. H. ALL

24/28 Clapham High Street,
London, S.W.1.

WIND BOATS FAILED

RE Mr. Norman Leith-Hay-Clark's letter on wind-propelled boats (October 19), this problem was investigated in the thirties and the result was quite a large ship which had two tall wind driven rotors, driving propulsion screws, thus making the vessel independent of its heading in relation to wind direction.

Results were disappointing and I assume the difficulty lies in producing rotors having an like the effective area of so that although the perfor to windward might be acce owing to the ability to sail out tacking, the performance the wind" would not compar that of a conventional saili

R. T. LAWR

Chilloway,
Pankridge Street,
Crondall, Surrey.

SPRAY FIGHTS RUST

ABOUT 500 tons of zinc wire will be used for the zinc spraying of the new Forth Road Bridge and this will keep part of the wire drawing plant of Charles Clifford, Birmingham, busy for two or three years.

Successful resistance from rust is dependent on an initial zinc coating about 0.003 in. thick and about four million sq. ft. of surface area will be treated.

Work is carried out at the prefabrication stage after grit blasting the metal to remove scale. The special paint supplied by Griffiths Bros. is then applied and provides the final sealing of surfaces

Special containers

The zinc wire is supplied in special containers which permit direct feeding to the spraying equipment and in this way first class condition is ensured.

Metallisation Ltd. designed and made the automatic spraying equipment which is being used at the works of the Cleveland Bridge and Engineering Co., Darlington and the A. C. D. Bridge Co's. depot at Drem, Scotland.

TEN TONS OF CO_2 USED A SECOND

AEI gas blowers to cool nuclear reactors at Dungeness power station

EIGHT gas blowers being manufactured by the Heavy Plant Division of Associated Electrical Industries Ltd. will circulate carbon dioxide gas to cool the two reactors in the nuclear power station now being built at Dungeness by the Nuclear Power Group for the Central Electricity Generating Board.

With two reactors in operation, the station will have a total net electrical output of 550 MW.

The reactor gas circuit will be pressurised to 300 p.s.i., and the gas temperatures at the inlet and outlet of each reactor will be 250°C. and 410°C. respectively.

Each blower, of the single-stage overhung axial type and driven by an AEI back-pressure steam turbine, will absorb approximately 9,000 h.p. at normal speed and will be capable of dealing with 1¼ tons of carbon dioxide per second.

Spherical casings

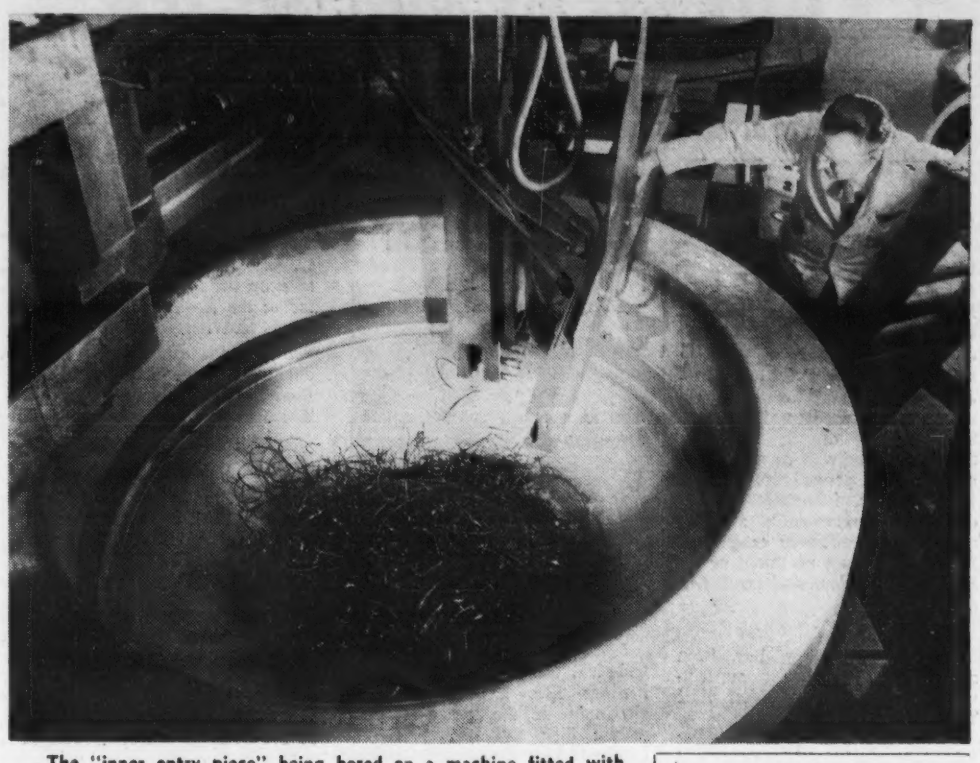
The blower casings will be spherical with a diameter of approximately 15 ft and will have four flanged branch-openings of 6 ft. 6in. diameter.

As each blower will be directly below its associated boiler, it is necessary to turn the gas through 180° to ensure the desired gas flow and at the same time conform with the preferred duct arrangement; special guides and fairing arrangements are therefore being provided within the casings.

Gas safeguard

As a safeguard against contaminated gas leaking to the atmosphere, running seals of the oil-fed face type will be situated between the impellor and the first bearing.

A stationary seal arrangement will enable full maintenance — including removal of the main driving shafts — to be carried out without reducing the circuit gas pressure.



The "inner entry piece" being bored on a machine fitted with AEI tracer control equipment. This piece will be fitted into the "driving flange" of the spherical blower casing.

A pony motor, rated 300 h.p., 3.3 kV, 3-phase, 50 c/s, will be incorporated with each unit, in line between the driving turbine and the blower.

The motors will be two-speed machines arranged to drive either at 500 rev./min., with full gas pressure or at 1,000 rev./min. at atmospheric pressure, and each will have two electrically driven closed-circuit cooling fans.

An anti-back-turning clutch, built-in with each blower, will automatically prevent reverse gas-flow from driving either the pony motor or the turbine.

For each blower-unit a separate oil system including tanks, pumps, filters, coolers and strainers will provide both lubricating oil and control oil for the driving turbine, pony motor and blower.

The driving turbines will operate on the total high-pressure steam output from the boilers; after passing out, the steam is returned for reheating before joining the steam flow to the main turbine generators.

Full control of the circuit gas is obtained by speed variation on the blower turbines; when balanced loads have been achieved, all four units associated with either reactor can be operated by means of a common control system.

B.R. USING PLASTICS PATTERNS

LIGHTER foundry patterns are being made by British Railways at their Eastleigh locomotive works by using glass fibre resin with a variety of fillers.

One pattern recently made is for the moulding of steam-heated radiators where the tolerances between the parting webs and fins is tightly held.

Each fin and intermediate body section is faced with impregnated mock leno Duraglas glass cloth, laminated with epoxy resin.

The pattern is easily stripped by hand and in contrast to its metal equivalent it can be moved about the foundry without the use of a crane.

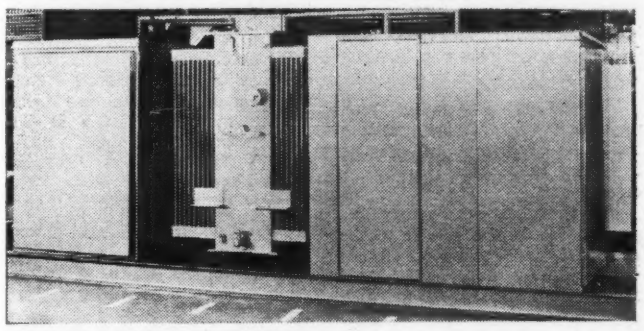
SHOE MACHINE PATENT

A MACHINE which has been proved in the shoe industry and is claimed to have a big potential in radio and other industries for stamping sheet metal with high accuracy, is to be patented and put into production by C. N. Unwin, of Lufton (near Yeovil).

This machine has been designed for marking the stitching lines on leather by pneumatic action.

With the use of dies the machine can be used for stamping intricate patterns by the same operation.

PRE-FAB SUBSTATION IN MINIATURE



A MINIATURE packaged substation (pictured above) 5ft 3in. high and suitable for 11 kV distribution has been introduced by South Wales Switchgear Ltd. of Blackwood, Monmouthshire.

It is a versatile unit, capable of meeting many applications and would fit unobtrusively in a location of natural beauty.

Orders have been received from the C.E.A., industrial users and overseas.

The substation is completely prefabricated to suit its particular function, and is designed to withstand all-weather conditions.

Orders have already been placed by area boards of the Central Electricity Board, by industrial users, and by overseas customers.

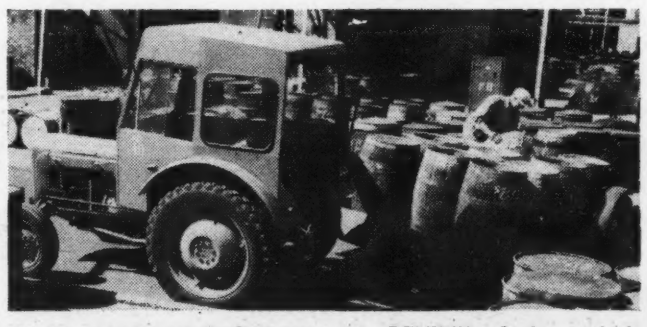
High-vacuum furnace

A HIGH-VACUUM brazing furnace, which is also suitable for annealing and age-hardening, has recently been built and supplied by Vacuum Research (Cambridge) to Services Electronics Research Laboratory, Baldock.

The furnace can be manually or automatically heated and controlled up to 1,300°C. with variable rates of heating.

A complete record of heating and cooling, together with the degree of outgassing can be made.

Radio-tractors cut time and fuel



A REVIEW of the methods and equipment used for the interdepartmental movement of thousands of barrels, drums and carboys at the I.C.I. Dyestuffs Division factory at Grangemouth has led to the introduction of radio-equipped tractors.

After a number of trials the Grangemouth works have standardised on Fordson Dexta Tractors fitted with Pye short-wave radio equipment, pictured above.

Weather protection

John M. Millar Ltd., Fordson tractor main dealers of Falkirk, supplied four Dexta tractors equipped with extended draw bars; special cabs were prefabricated to I.C.I. specification by Millar to give weather protection without impairing visibility.

The driver of each vehicle is able to report his position to a central control room

Here, requests for tractor transport are received by telephone and priorities assessed, the most appropriate tractor then being directed to the point required.

Boiler-risk warnings

SUCCESSFUL efforts to improve heat rates of furnaces and thus reduce the cost of generating electricity have increased the chances of explosions.

With this in mind, the Babcock and Wilcox Co. boiler division in Barbeton, Ohio, has produced a booklet outlining the dangers and giving safety recommendations.

These can be reduced by ensuring that operators are fully qualified; that operational drill is practised regularly; and that equipment is properly maintained.

If these precautions are coupled with the use of such devices as automated burner control, a safety interlock system for fan and fuel supply failure, together with over-pressure interlocks, then the chance of explosion is virtually eliminated.

NEXT WEEK

MANY readers have written to Engineering News expressing their appreciation of **J. D. F. Perry's** five penetrating reports on Britain's opportunities in the Common Market. Next week he concludes his survey of six nations with a lucid but forceful summary of the overall situation.

Plastics—vital materials today

In an article specially written for Engineering News, **Dr. C. L. Child,** Head of Information Services Division, I.C.I. Plastics, asks for a new approach to the use of plastics in engineering design.

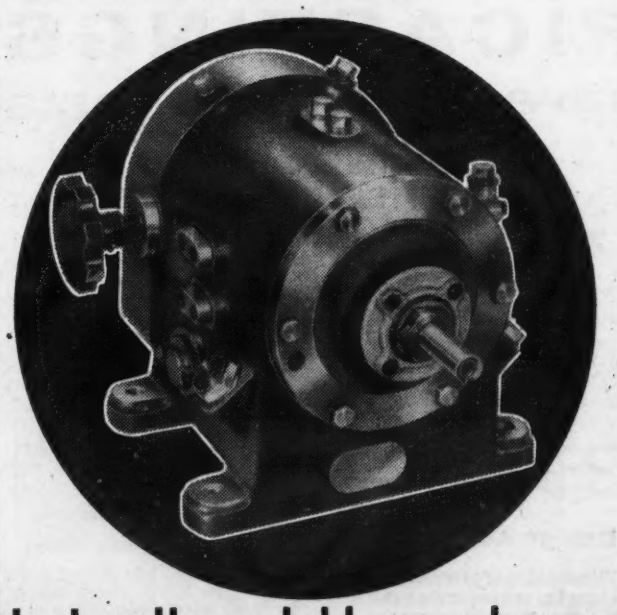
He considers the problems involved in using plastics for components previously made in metal, and points to some of the solutions.

Important service for readers

Hundreds of readers are making use of the Engineering News Reader Enquiry Service. Once again in next week's issue there will be comprehensive accounts of new products with the opportunity to write to the Enquiry Service for further details.

Positive hydraulic drives providing smooth stepless speed variation over 27/1 range with sensitive accurate control at all output speeds. Carter Gears are made in eleven sizes for variable speed drives from fractional up to forty horsepower. Speed control setting adjustments may be made with the drive either running or stationary by remote electrical, lever or handwheel controls (all available as standard) and many forms of pneumatic, etc., control systems may also be used.

CARTER



hydraulic variable speed gears

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PEOPLE in the NEWS

Prominent T.U.C. man as head of productivity council

THE general secretary of the Iron and Steel Trades Confederation, Mr. H. Douglas, is to succeed Sir Bertram Waring, head of Joseph Lucas Ltd., as chairman of the British Productivity Council. This appointment takes effect as from January 1.

The chairman elect is a part-time member of the Iron and Steel Board as well as a member of the TUC general council and its economic, international, production, commonwealth advisory and scientific advisory committee. He is also a past president of the International Metalworkers Federation.

Mr. H. Douglas

☆

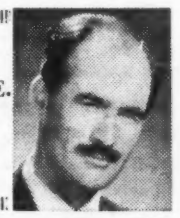
Mr. J. E. Bailey has been appointed assistant superintendent, Petershill Works, AEI Turbine-Generator Division.

He joined Metropolitan-Vickers Electrical Co. Ltd. in 1953 and after completion of his college apprenticeship at the Trafford Park Works became cost reduction engineer at the Petershill works.

He returned to the Trafford Park Works in 1957 as production engineer, Small Turbine department and was appointed Divisional production engineer of the Turbine-Generator Division in 1958.

☆

Mr. L. F. E. Coombs, who was until recently, technical secretary of the British Air Line Pilots' Association, has joined the technical sales department of Smiths



Mr. L. F. E. Coombs

Aviation Division. He will be concerned with the marketing of engine instruments and equipment from the Division's headquarters at Wembley.

After leaving the R.A.F. Mr. Coombs took up a career in the aircraft industry and for several years was engaged on design and development work with Handley Page and Delaney Gallay.

During his six years with B.A.L.P.A., he was responsible for the organisation of all the association's technical activities.

☆

Mr. R. L. H. Damerham, technical director of Durapipe & Fittings Ltd. has been elected chairman of the new Thermo-plastic Pipe and Fittings Group of the British Plastics Federation.

Mr. Damerham, who also chaired the Federation's former pipe fittings sub-committee and is U.K. delegate to the International Standards Organization, has actively campaigned during the last few years for closer integration in the pipe and fittings section of the industry.

☆

Mr. N. R. D. Gurney has been appointed general manager of Davy-AEI Automation Ltd. He is also a director of the company.

Mr. Gurney was previously Manchester executive of the heavy plant division of AEI.

☆

Following the completion of the merger between The Plessey Company Limited, Automatic Telephone and Electric Company Limited and Ericsson Telephones Limited, it is announced that **Mr. A. F. Roger,** chairman of Automatic Telephone and Electric Co. Ltd., and **Sir Harold A. Werner,** chairman of Ericsson Telephones Ltd., have been appointed to the board of directors of The Plessey Company Ltd.

☆

The Council for Scientific and Industrial Research has appointed **Dr. J. V. Dunworth** as deputy director, National Physical Laboratory, DSIR, in succession to **Dr. G. MacFarlane,** who is shortly to take up the appointment of director of the Royal Radar Establishment, Malvern.

Dr. Dunworth is at present deputy director of the Atomic Energy Establishment, Winfrith. The date on which he will take up his appointment will be announced later.

Dr. Dunworth, who is 44 and unmarried, was born in Manchester and educated at the Manchester Grammar School. He graduated with first-class honours at Cambridge University in 1937 and then stayed on to do post-graduate research under the guidance of **Lord Rutherford** and **Professor Norman Feather.**

Shortly before the outbreak of war in 1939, he became a member of **Sir John Cockcroft's** team investigating problems in the use of radar.

In 1944 he went to Canada with Sir John to work with the National Research Council on atomic energy development.

Later he returned to Cambridge University to take up his fellowship at Trinity College and was appointed a demonstrator in physics at the Cavendish Laboratory. In 1946 he rejoined Sir John Cockcroft at the A.E.R.E., Harwell.

Dr. Dunworth is editor-in-chief of the International Journal of Nuclear Energy.

☆

Mr. W. H. Rigg has been appointed managing director of Firth Cleveland Tools Ltd., a member of the Firth Cleveland Group.

In 1951 he joined Vono Industrial Products Ltd. (now known as Duport Ltd.) as chief engineer. Two years later, he was invited to take over direction of his former position with Vono Ltd. and was appointed director and assistant managing director.

In the transitional period while Revo Electric Co. Ltd. was being acquired by the Duport Group, Mr. Rigg was given the job of reorganising the structure of the company as works director, and in 1957 was appointed managing director.

Mr. G. Harries, who since May, 1954, has been secretary of Firth Cleveland Ltd., has been a member of the board of directors of this company.

Before joining the company in December, 1953, as assistant to the finance director, Mr. Harries was, for nearly six years, in the organisation and methods department of the Treasury.

He became director of the Solartron Electronic Group Ltd. in January, 1960.

☆

Fibreglass Ltd. announce that **Mr. A. Hudson Davies** is to become vice-chairman on November 1st.

Mr. John Creek will succeed him as managing director on that date. The company is a subsidiary of Pilkington Brothers.

☆

Electronic Instruments Ltd. have recently appointed **Mr. K. B. Hogg** as general works manager.

In 1957, he was appointed works manager at Associated Electrical Industries Ltd., Brimsdown, running three factories concerned with radio valves, cathode-ray tubes and car batteries. He was promoted to general works manager responsible for the five Southern Group factories of AEI in 1958, until he joined E.I.L.

Mr. Hogg's other activities include chairmanship of the Edinburgh Association, 1950-51, director of the Dundee Junior Chamber of Commerce, 1954-57, and conference member of H.R.H. The Duke of Edinburgh's Oxford Study Conference.

☆

The death occurred of **Dr. Brian Goodlet** on October 27.

Dr. Goodlet helped to gain a world lead in the use of atomic energy for producing electrical power. From 1950-56 he was deputy chief engineer of the Atomic Energy Research Establishment at Harwell. Then he became managing director of Brush Electrical, a division of the Hawker-Siddeley Group.

Dr. Goodlet was 58.

☆

Mr. C. M. Cohen, who has just completed forty-five years with the George Cohen 600 Group Ltd. at the Wood Lane headquarters was presented with a silver and enamel cigarette box from the group's employees to mark the occasion, on 18th October.

The presentation was made by **Mr. D. W. Cooper,** a director of the firm in the presence of a gathering of people representing the group's thirty-six companies at home and overseas.

☆

A former president of the Institute of Mining Engineers and a member of the Geological Survey Board since 1959, **Professor J. C. Mitcheson,** has been appointed chairman of the board in succession to Sir Walter Drummond.

Professor Mitcheson, Dean of the Royal School of Mines, has occupied the Chair of Mining at the Royal School of Mines since 1953. He worked in various Midlands coalfields and from 1944 to 1945 he was seconded to the Ministry of Fuel and Power as director of production for the Warwickshire coalfield. From 1947 to 1952 he was a consulting mining engineer.

The professor is chairman of the Safety in Mines Research (Advisory) Board.

☆

Mr. C. Moody, assistant general works superintendent for Dorman Long (Steel) Ltd., Eston, was elected president of the Cleveland Scientific and Technical Institute at the annual meeting at Middlesbrough.

He succeeds **Mr. S. H. Dunlop,** production director, Central Marine Works, West Hartlepool.

Mr. J. H. Wright, chief metallurgist of Dorman Long and Co. Ltd., Newport, was re-elected vice-president.

☆

The Carrier Engineering Company have appointed **Mr. J. W. Smith** as a director and **Mr. J. A. E. Heard** as assistant managing director.

☆

The Rexall Drug & Chemical Co., whose headquarters are in Los Angeles, but who have been established in Lancashire for many years, are to extend their plastics interests in Europe by establishing the Imco Container Co., the first manufacturing unit being at Golborne in Lancashire.

The Imco Container Co., with headquarters in Kansas City and seven manufacturing plants throughout the U.S.A. and Canada, has been one of the pioneers in developing polythene and poypropylene bottles and containers.

Mr. Jack Kenyon has been appointed managing director of the new company which expects to go into production in the early months of 1962.

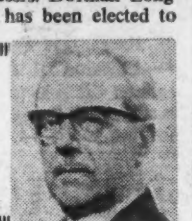
It is planned to employ eventually about 200 workers on automatic processes in the new plant and other manufacturing units are to be set up in Europe.

☆

Mr. Edward Elliott has been appointed managing director of William Dickinson Ltd., Phoenix Ironworks, Blackburn (a subsidiary of R. & J. Dick Ltd., of Glasgow). A director of the company since January, and also a director of L. Sterne & Co. Ltd., Mr. Elliott succeeds **Mr. J. Marsden** who resigned in March because of ill health.

☆

Mr. James Jack, a commercial director of Messrs. Dorman Long and Co. Ltd., has been elected to the board of Darlington and Simpson Rolling Mills.



Mr. C. W. Page

He succeeds the late **Sir Ellis Hunter.**

☆

Durapipe & Fittings Ltd., thermo-plastic pipe and fittings manufacturers, announce the appointment of **Mr. D. C. B. Chandler** as United Kingdom sales manager.

Mr. Chandler joined the company's sales force in 1956, after eight years in South Africa where he gained an extensive knowledge of the water treatment industry, particularly pipe engineering and corrosion problems.

☆

Mr. H. C. McIntyre, works director for the past seven years at the Wallsend works of the North-Eastern Marine Engineering Co. Ltd., is to become director and general manager of the National Gas and Oil Engine Co. Ltd., Ashton-under-Lyne.

Mr. McIntyre started his career with Messrs. George Clark Ltd., Sunderland. He was appointed works manager of the North-Eastern Marine in 1946, and became works director in 1954.

☆

Mr. C. W. Page has been appointed sales manager of the Industrial Division of Castrol Industrial Ltd. This is a newly-created post.

Mr. Page has given thirty-four years uninterrupted service to the industrial side of the Castrol Group. He joined the Industrial Oils Department in 1927 and was appointed assistant sales manager in 1936. He has also been Lubrication Service Manager and later was assistant sales manager of Wakefield-Dick Industrial Oils Ltd. (now Castrol Industrial Ltd.).

For the past three years, he has been a departmental sales manager within the Industrial Division.

☆

Mr. G. B. Jones has been appointed secretary and chief accountant of Dynamo Repairs, of Wembley ingham, a company in Industries Group.

Previously, Mr. Jon management accountan Evershed and Vignole Chiswick.

☆

Lord Piercy was re-ele dent of the Institution Managers for the ninth time at the first meeti newly elected council of tution held after th general meeting on Sat

The outgoing chairma **M. Hudson-Savies,** was by **Mr. John Ayres,** Director, Simms Mot Finchley.

At the same meeting **Starkey,** Technical Direc lex, Swinton, was elect Chairman; **Mr. H.** Director of Electronic R Ministry of Avia re-elected Honorary Trea **Mr. R. S. Silman,** Director of the Ship C of Great Britain, was Membership Counsellor.

☆

Mr. H. C. Baadsga director of Nu-Swift retired and resigned his

Sir Leonard Owen

ships of Nu-Swift Ltd associated companies.

Mr. Frank Tompkins, director, has been appoi Sales director in his pl

☆

Sir Eric Jones, K.C.M C.B.E. who, from 1952 was director of Governm munications Headquarte Foreign Office, has join ated Electrical Industrie a consultant.

☆

Sir William Leona whose appointment as member of the United Atomic Energy Authori on June 30th, 1962, reappointed by the M Science, **Lord Hailsha** member of the Autho part-time basis, for a pe

Sir Leonard will co chairman of the board' ment of the Produc Engineering Groups.

The Minister reappointed **Lord Citr** part-time member of th ity until December 31st

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Coming EVENTS

THIS WEEK

October 26-November 5
Los Angeles 39th International Automobile Show.

November 3-4
Fourth Materials Handling Convention. Connaught Rooms, Great Queen Street, London, W.C2.

November 7-12
Convention on Automation and Instrumentation, Milan.

November 8-10
Conference on Non-destructive Testing, Institution of Electrical Engineers, London, W.C.2.

November 8-14
International Dairy Equipment Exhibition, Paris.

November 10-18
Scottish Motor Show, Kelvin Hall, Glasgow.

November 13-16
National Maintenance Conference and Exhibition, Central Hall, London.

Seventh Annual Conference on Magnetism and Magnetic Materials, Phoenix, Arizona.

November 13-18
Engineering Materials and Design Exhibition, Earls Court, London.
Factory Equipment Exhibition, Earls Court, London.

November 15-29
Building Exhibition, Olympia, London.

November 16-19
Conference, Scientific Manufacturers' Associa Hotel, Eastbourne.

November 22-27
Fifth Conference and Automation and Instr Milan.

November 23
One-day conference of Institute of Manageme ciency in the Office, Rooms, London, W.C.

November 27-December 1
Fifth Congress and Automation Exposition,

January 3-13
8th National Boat S Court, London.

January 8-12
International Heat tra ference, Institution of Engineers, Westminster.

January 9-11
Eighth National Sym Reliability and Quali Washington, D.C.

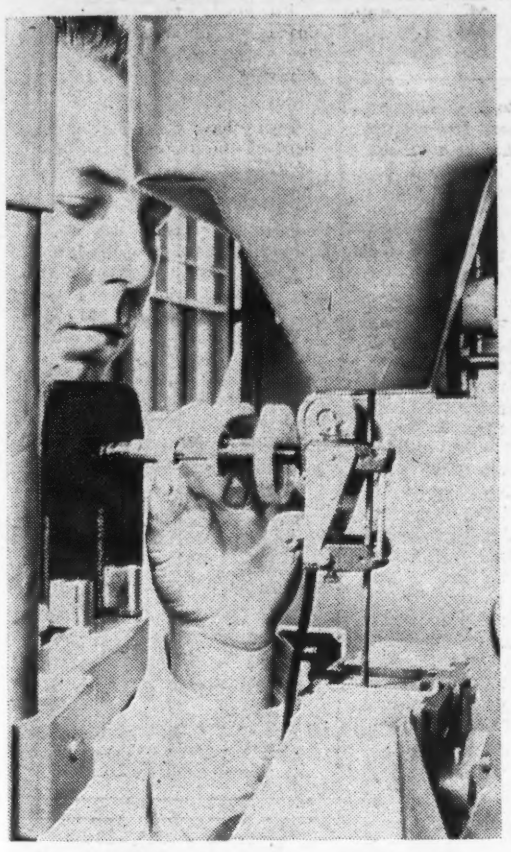
January 22-25
National Plant Maint Engineering Show, Phil A.F.S. Castings Co Exposition and 29th Foundry Congress, De

January 29-February 2
Electrical Engineering New York

April 5-8
5th Annual British M Queen Elizabeth Hotel

RESEARCH ON WIRE

British Ropes open Doncaster laboratories



A 12,000lb. capacity Avery tensile testing machine fitted with electrical extensometer and recording system.

THE Central Research Department of British Ropes Ltd., built and equipped at a cost of nearly £200,000, was formally opened last Friday by Mr. Niall Macpherson, M.P., Parliamentary Secretary to the Board of Trade. The unit comprises wire and rope research laboratories at Doncaster, and a marine testing station off the Norfolk coast.

Recording pyrometer

Extensive studies of the characteristics of the regular supplies of wire rods are being made at the wire research laboratories, main attention being made to the number and type of surface defects.

Investigations range from raw material to heat treatment and wire drawing, to the final product.

Due to the continuous nature of the heat-treatment process used in wire production, a special recording pyrometer has been developed to reveal the temperature changes in the material as it passes through the plant.

Physical properties

The more important physical properties of the various types of wire used include fatigue strength, stress relaxation and stress/strain factors and much of the department's time is spent in their determination.

Among the physical testing equipment is an Instron machine which is based on the strain-gauge cell weighing system. This enables the stress/strain properties of wire to be determined with speed and accuracy.

British Ropes have also installed an Elmiskop II electron microscope, manufactured by Siemens and Halske, which has a maximum useful magnification of about 50,000 times.

The rope research department is also well provided. The equipment includes a Zeiss photo-micrographic unit, an Amsler universal pulsatory fatigue-testing machine capable of applying static and dynamic loads to ropes up to 2½in. diameter and a Watson stereoscope microscope with camera attachments.

In this department there are six sections each run by a senior specialist.

All junior staff are taking approved training courses at local technical colleges and will, in course of time, up-grade to graduates.

The company has also started its own training scheme within the department so that there will be two sources for filling senior positions in the future.

Gas-ignition sensing system

AN ignition system for service in gas-fired equipment which senses the presence of flame in three seconds and the absence of flame in six seconds has been introduced by General Electric's Appliance Control Department, Morrison, Illinois.

Operating on 120 volts throughout, the system comprises a master control unit and a gas igniter.

It works on a thermostat or any other control. A safety device of the system comprises a flame detector and lockout mechanism.

TANDEM ROLLER GOES ON TEST

The four-ton tandem vibratory roller at work

A FOUR-TON tandem vibratory roller is at present undergoing extensive proving tests on one of Britain's major trunk road developments.

Made by Thomas Green & Son of Leeds, the new machine is similar to their 30 cwt model and will be available for purchase in 1962.

The roller features Green's patented vibratory mechanism. This incorporates an eccentric rotor mounted on roller bearings housed within the driving roll, with independent drive.

A "dead" shaft passes through the rotor tube and is coupled to the chassis with flexible mounting brackets.

The vibrating frequency can be varied by throttle control.

Main frame is fabricated from steel channel and plate and designed to withstand severe working conditions. Mountings are incorporated to isolate the vibration from main frame, engine and gear box assemblies.

Power unit is a Petter air-cooled diesel engine developing 15 b.h.p. at maximum governed speed of 1,800 r.p.m. Transmission is through a three-speed reverse gearbox, infinitely variable up to 6 m.p.h.

This machine, when using its vibrating capacity, is claimed to be ideal for all types of base working, particularly where large areas must be severely compacted.

With the vibrating mechanism switched off it can be utilised as a dead weight roller for all stages of road construction.

RADIO-ACTIVE BALL FINDS HIDDEN LEAK

A SIMPLE yet highly effective operation was recently carried out by the U.K.A.E.A. at the London headquarters of Firth Cleveland.

It determined the position of a leak in a buried heating system. Water was escaping at some five gallons per hour into the firm's showrooms, and audible detection had given no results due to the duct being full of water.

An expanded rubber ball was made, slightly smaller than the 1¼in. diameter bore mains piping. A 25 mgm pellet of irradiated sodium bicarbonate containing 25 micro-curies of Sodium 24 was sealed in metal foil and inserted into the centre.

The ball was passed through a radiator feed pipe into the main before the suspect area.

All outlets were closed and water turned on at normal pressure without using the circulating pump.

The flow towards the leak carried the "radio-active" ball at approximately one foot per minute inside the pipe, round corners, radiator stabbings, and past a change of level.

Portable ratemeters with scintillation counter detectors were used to track the ball through various thicknesses of concrete and different floors.

AMERICAN LETTER

University of Columbia study vacuum depositing

METHODS for producing lead-coated steel have been under investigation at the Metallurgy Department of The University of Columbia.

The processes being studied are vacuum deposition, plating, direct powder cladding, foil cladding, and hot dipping.

In recent months particular attention has been paid to the production of lead-coated steel by powder metallurgy techniques. The main object was to see if coating steel strip with a thin layer of lead by directly roll-compacting lead powder was an economical and satisfactory procedure.

The adhesion and mechanical properties of coatings between 0.001 and 0.015in. was good but coatings below 0.005in. were porous.

The coating process does not result in more than about 5 per cent reduction in thickness of the steel strip so that the formability of the strip is not seriously affected. Rolling loads of about 8,000lb. were involved in obtaining a 0.002in. coating from 100 mesh powder.

* * *

Chemical milling is gaining ground according to a report by the Watervliet Arsenal. Innovations in this process have ushered in an industrial field so new in concept and so broad in scope that the designer's ingenuity should be his only limitation in exploiting it.

Although the removal of metal by chemical action is not new, only recently have techniques been perfected for really accurate production of complex shapes. The breakthrough in this field is attributed to new organic coatings for stopping off, new etching solutions that give uniform rates of attack without destroying the physical and chemical properties of the metal, and new electronic measuring and control equipment.

Some of the metals that have been successfully milled with chemicals are aluminium alloys, steel, stainless steel, titanium, magnesium, and mag-thorium.

'New-look for coal mining by 1965'

DETAILS were given in Parliament last week of the growing mechanisation which is transforming the coal industry.

Mechanisation had made a substantial advance this year, reported the Minister of Power Mr. Richard Wood in a Commons debate on the industry.

In 1960, about 38 per cent of output was power-loaded; by the end of this year the National Coal Board expected more than half the output to be power-loaded.

* * *

At the start of the year, 1,200 power loaders were working and 400 new ones were being added by the end of the year. The Board were also introducing power-operated supports and were carrying out important development work on the mechanisation of underground tasks.

BY OUR PARLIAMENTARY CORRESPONDENT

Reference to some of the machines was made by a miner-M.P., Mr. William Blyton (Labour, Houghton-le-Spring).

Mr. John George, Parliamentary Secretary to the Ministry of Power, said that another new piece of mining equipment was a ripping machine, which was almost as important as the power-loader.

He declared: "By 1965 we shall virtually have a new mining industry, perhaps 80 per cent of output power-loaded with able research and development teams planning more and better machines to banish the hard grinding labour from mining in order to obtain still higher output with fewer men."

* * *

Work on the construction of Swaziland's first railway line—an £8 million project—is to begin as soon as possible, the Lords were told by the Commonwealth Relations Under-Secretary, the Duke of Devonshire.

It is hoped the line will be open for through traffic by the end of 1964. The railway will run for 140 miles from the west of Swaziland to the Mozambique border, where it will link with the Portuguese railway to Lourenco Marques.

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CENTRIFUGAL GOVERNOR OPERATES IN FLUIDS

CENTRIFUGAL governors are sometimes required to operate within a fluid medium — as, for instance, governors for the fuel control of gas turbine engines. In such cases the rotation of the flyweights causes a rotation of fluid resulting in a pressure gradient increasing with the distance from the spin axis of the governor mechanism. This in turn produces an undesirable force on the flyweights, the force depending on fluid density which itself varies with temperature. **Patent No. 880,402,** filed by **The Bendix Corporation,** U.S.A., aims to provide a centrifugal weight member for operation in a fluid medium which is insensitive to changes in fluid density due to variations in temperature or the type of fluid.

An essential ingredient of the invention is the provision of a centrifugal weight and a counterweight of different densities. The arrangement of a fluid immersed governor having centrifugal weights in accordance with the invention is shown in the larger illustration. The centrifugal weight members 18 are pivoted at 22 to brackets 20 mounted on a spin table 24 at a spaced distance from the centre of rotation. The spin table is driven by an input shaft 32. The centrifugal weight members each comprise a flyweight element 26, a counterweight element 28, and a lever 30. An axially movable shaft 36 includes a diametrically enlarged portion 38 contacting the levers 30. This shaft controls, through a pilot valve 40, movements of a servocontrol piston 44. This, in addition to its speed-control functions through rod 46, also provides a feedback balancing force to the governor member 38 through rod 48, the movable retainer 50 and the spring 52.

By analysis of the dynamics of the system (set out in detail in the Patent) it can be shown that, provided

$$V_1 r_1 Y_1 = V_2 r_2 Y_2$$

and

$$d_2 < d_1$$

where V is the volume of the mass,

d is the density of the mass,

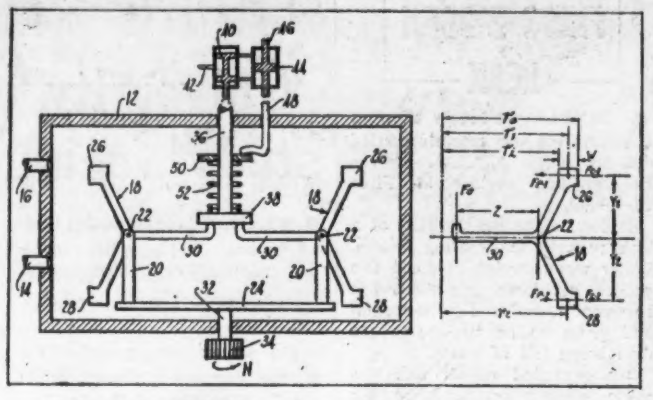
r is the radial distance of the centroid of the mass from the axis of rotation,

Y is the distance of the mass from the plane passing through the pivot axis 22 and normal to the axis of rotation,

suffix 1 refers to the centrifugal flyball,

2 refers to the counterweight,

then the output force of the mechanism is independent of the fluid density.



Patent No. 880,402

FLEXIBLE TEMPERATURE CONTROL FOR BOILER

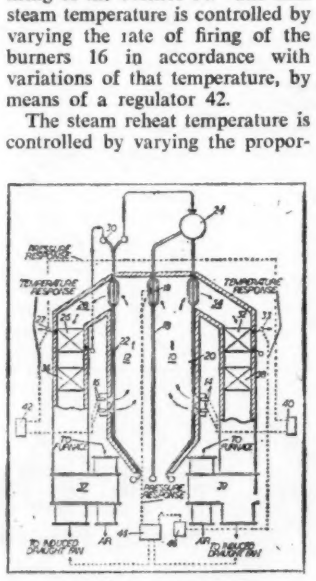
A BOILER arrangement claimed to have a very flexible control of superheat and reheat temperatures over a wide range of loads, particularly suited for use in large land boilers, is covered by **Patent No. 880,258** granted to **Foster Wheeler, Ltd.**

The boiler has two furnaces 10 and 12 fired by independent burners 14, 16. The furnace 10 serves for steam generation, its outer wall being lined with water tubes 20 leading to a steam drum 24, as do also the tubes of the water wall 18. The outlet duct 34 of furnace 10 contains a reheater 32 and an economiser 38.

The furnace 12 serves for superheating steam drawn from the drum 24. Its outer wall is lined with steam tubes 22. The outlet duct 28 contains a final superheater 26 and an economiser 36.

The furnaces 10 and 12 are connected through an opening 19 in the water wall 18 so that the furnace gases from each of them can be passed through the two outlet ducts 34, 28 in controlled proportions. The rate of steam generation is controlled by variations in the pressure at the final superheater outlet 27, which cause a regulator 40 to vary the rate of firing of the burners 14. The final steam temperature is controlled by varying the rate of firing of the burners 16 in accordance with variations of that temperature, by means of a regulator 42.

The steam reheat temperature is controlled by varying the proportions in which the gases from the two furnaces pass to the outlet ducts 28, 34, by means of regulators 44 and 46. Regulator 44 responds to pressure variations at the opening 19 in the water wall 18, and varies the suction of the induced draught fans (not shown) accordingly. Regulator 46 biases regulator 44 in accordance with temperature variations at the reheater outlet 33, so as to produce a differential suction in the two ducts 28 and 34.



Patent No. 880,258

Thus the final steam temperature and the reheat temperature are automatically controlled and can be kept at any desired levels in spite of variations of the rate of steam generation. It can be arranged that when the boiler is started up, only the steam generating furnace is used and the whole of the gases are passed through the superheater duct. This avoids possible overheating of the tubes in the superheater furnace and assists in bringing the boiler rapidly up to its operating condition.

IONISATION FLAME DETECTOR

A FLAME detector, described by the **Graviner Manufacturing Co., Ltd.** in **Patent No. 879,482,** depends for its operation on the ionisation which occurs in a flame. In contrast with earlier types of ionisation flame detectors, it uses a single highly charged electrode which does not require to be in contact with the flame or burning material.

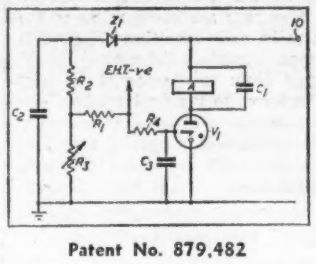
In a particular example outlined in the patent, the flame detector consists of a single electrode 10 connected to the positive terminal of a high-voltage source. The other terminal of the high-voltage source is connected to the terminal marked E.H.T. negative in the detecting circuit diagram. When a grounded flame is in the vicinity of the electrode 10, a current will flow from the negative E.H.T. terminal to ground. This current is detected in the electrical circuit. It is believed that the electrostatic field produced by the positively charged electrode attracts to the electrode some of the electrons from the ionised flame. Electrons removed from the flame are replaced by electrons from the ground mass, and the circuit is completed by electrons moving to ground from the negative terminal of the E.H.T. source.

The operation of the detector circuit is, very briefly, as follows (Full details of the circuit are given in the Patent). A potential will be developed across the load resistor R_1 proportional to the electron flow to ground. This potential is applied to the trigger electrode of a cold cathode valve V_1; at a predetermined potential the valve is rendered conductive and energises a relay A, connected in the anode circuit to effect any desired indication, control or other operation—for example, a visible or audible fire warning; or alternatively, as a flame-failure detector, the warning may be operated when the relay ceases to operate due to the flame having been extinguished.

Preferably, the detection electrode should have a smooth surface and a cross-section free from points, to avoid brush discharge. It may be of conductive or semi-conductive material, but the latter is preferred for safety, as it limits the rate of discharge from any point of the electrode surface which might accidentally be contacted by conductive material.

As an alternative to a rigid electrode, it is possible to use a mechanically strong insulated wire provided at intervals along its length with rounded blocks of semi-conductive material which are electrically connected to the centre conductor or semi-conductor. Each block will have an electrostative field of influence. For lightness, such blocks might be of foamed material rendered semi-conductive by a suitable pigment.

Practical embodiments of the invention have, for sensitivity, used high voltage sources ranging from 8 to 30kV, but it has been established that the detector will operate on a 1kV source. Where there is a danger of physical contact, the high voltage source should be of high impedance.

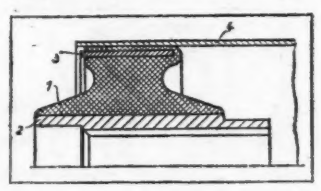


Patent No. 879,482

new PATENTS

RESILIENT VIBRATION SUPPRESSING COUPLINGS

A NEW form of rubber bush construction, for transmitting torque between an inner shaft and an outer tubular shaft, is described in **Patent No. 879,028.** The inventors, **Gelenkwellenban G.m.b.H.** of Essen, Germany, claim that not only is it cheaper to produce than earlier forms of resilient rubber bush, but also it has an outstanding vibration-suppressing effect.



Patent No. 879,028

Referring to the illustration, in its basic form it consists of a conventionally formed rubber bush 1 bonded by vulcanisation on to a sleeve 2. Near the outer periphery of the rubber bush, a metal ring 3 is vulcanised into the rubber so as to divide the bush into a large inner portion and a substantially smaller inner portion. The rubber bush is overdimensioned and is forced under compression into the outer tube 4. Machining of the inside surface of the tube is unnecessary.

The embedded vulcanised ring 3 can be an ordinary cut-off from a standard tube, requiring only a sand-blasting treatment. By dividing the bush into two parts which are under substantially different compression, in effect a double spring is created with unequal characteristics — hence the good vibration damping properties. Other variants of the invention, such as a flanged edge to metal ring, openings into which the rubber can bulge, bulbous indentations, segmental construction of the ring, etc., provide for additional anchorage or increased compression stress in the bush.

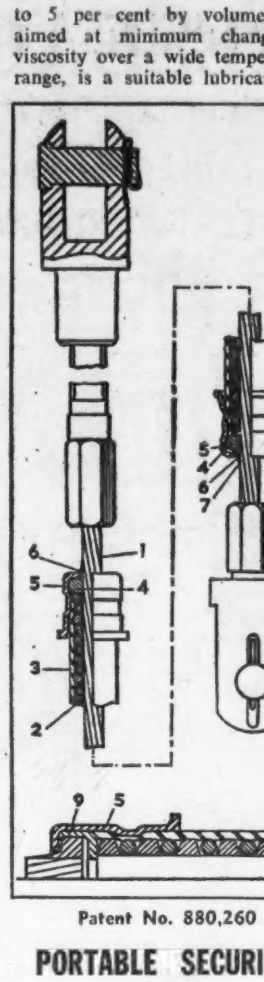
SEALING CABLE AND CONDUIT ASSEMBLIES

THE problem of sealing the ends of Bowden cable conduits, to retain lubricant and prevent the entry of water and dirt, without creating undue friction and wear, has presented considerable difficulty. **Patent No. 880,260,** filed by **Walter Arthur Nelson** and **Bowden (Engineers) Ltd.,** aims to overcome this.

The sealing device comprises a cup-like sleeve 5 which is sealed on to the flexible covering 3 of the cable conduit 2, by swaging or any similar means. At each end of the cable 1 a low friction sealing ring 4 is provided, the ring being held in sealing engagement with the sleeve. In the version illustrated the sealing ring has a tapering lip 6 the outer end of which is feathered to a fine edge 7; in alternative versions, the inner end or both ends of the lip are feathered. The ring is a slidable fit on the cable and the feathered edge is designed to press lightly on the lubricated cable. Where the cable is composed of small diameter wire, the lubricant adequately seals the small openings formed by the grooves and ring.

Where a cable is used in which the outer layers of wires are of relatively large diameter, the ring may be rifled internally to correspond with the grooving of the cable and to make a rotary sliding fit with it. In this case the ring is housed in a U-section retaining ring 9, which allows it to rotate but still maintains sealing engagement with the sleeve.

Particularly good results have been obtained with nylon, p.t.f.e. or hard p.v.c. rings. Another good ring material is Duron, a graphite-loaded resin-bonded asbestos fibre with a very low coefficient of friction. A mineral base grease loaded with graphite up to 15 per cent. or MoS_2 up to 5 per cent by volume aimed at minimum change viscosity over a wide temperature range, is a suitable lubrica



Patent No. 880,260

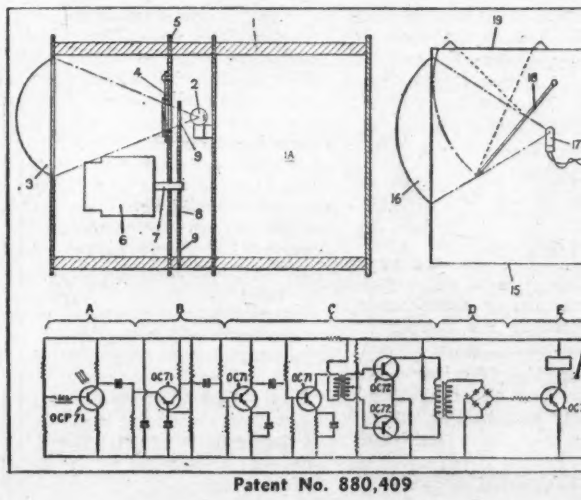
PORTABLE SECURITY ALARM

A BATTERY-OPERA portable burglar or se alarm is the subject of **Patent 880,409,** granted to **Burgot R Ltd.** It comprises an inf projector unit and an inf receiver unit, designed t spaced apart so that the inf beam traverses the space protected.

The projector unit houses small portable case 1, a 6. filament flashlamp bulb 2 focal point of a plano-conve 3 fitted in the front wall case. Between the bulb an is an infra-red filter 4, whic be moved out of the ligh for setting-up. A battery-op speed-governed motor 6 dri interrupter disc 8 between th and the filter. The interrupt has a series of apertures provide for a pulsed beam o at a desired frequency. battery is housed in the rea of the case 1a.

The receiver unit has a transistor 17 at the focal po a plano-convex lens 16 carr the front wall of the case is provided with a reflecting finder arrangement generally lar to that used in reflex ca

The receiver unit also in an amplifier which is tuned projector light frequency. amplifier output controls, relay, a visual or audible device. When the correct frequency is being receive alarm circuit is open, but the frequency is varied light beam is interrupte alarm circuit is completed a warning device operates.



Patent No. 880,409

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Tech. college wind tunnel

VITAL TRAINING FOR ENGINEERS AT FARNBOROUGH

FARNBOROUGH has become one of the very few technical colleges in the country that has the facility of an up-to-date wind tunnel.

The opening ceremony took place last Friday of the low speed wind tunnel. With the high degree of specialisation it is vital that students training to be engineers should have the opportunity to use and operate the tools that have now become the back-bone of their industry, regardless of the expense of the equipment.

Designed by students

The basic aerodynamic design of the tunnel was undertaken by the senior students of the college under the guidance of the Low Speed Tunnels Division of the Aeronautical Department of the Royal Aeronautical Establishment, Farnborough.

The practical engineering design, drawings and responsibility of the over-all project were with the technical facilities department.

The tunnel is a 4½ by 3½ feet closed circuit type, designed for a maximum speed of 150 feet per second. For the last 12 years a 20-in. diameter open jet return circuit low speed wind tunnel has been used in the aerodynamics laboratory of the college.

Advanced work

The new tunnel will be used with the older one, to make balance measurements of the aerodynamic forces and moments on models of aeroplanes; to carry out pressure distribution surveys on the flow over aerofoils; and various other quantitative tests on subsonic aerodynamics.

The experimental work will lead to the Higher National Certificate in either aeronautical or mechanical engineering. The apparatus is also particularly suitable for advanced project work and research.

Timber construction has been used wherever possible, and the complete tunnel circuit has been designed in 13 sections suitable for prefabrication.

Its 7½ feet diameter fan as made to R.A.E. specifications by Airscrew and Jicwood of Weybridge. There are six blades made from laminated mahogany. The maximum speed is 930 revolutions per minute, giving a maximum tip speed of 350 feet per second.

The rotary movement of the air leaving the fan is removed by five specially shaped air straighteners installed in a short-distance down stream of the fan.

The drive motor develops about 37 h.p. and is a constant speed 400 volts 3 phase machine rotating at 1,470 rpm.

A reduction gear of 3 : 2 gives the required step-down to the fan Variation in fan speed is given by means of a "fluid drive" controlled slip variable speed fluid coupling, which is remotely controlled from the control panel near the working section.

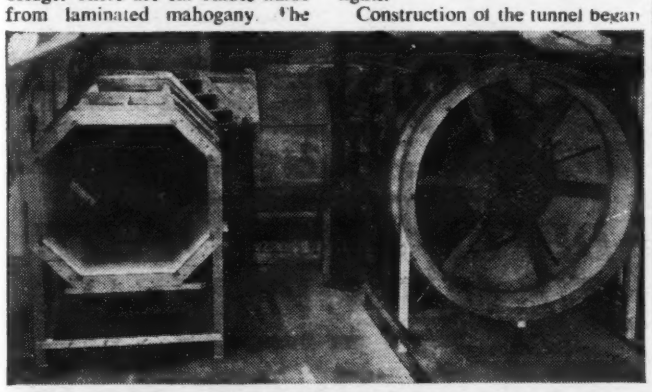
The speed of the fan may be varied between 150 and 930 revolutions per minute, with an accuracy of ±0.5 per cent.

Good view

The control panel which is sited to give a good view of the working section, contains a tachometer indicating fan speed, a wattmeter for the power input to the motor, speed controller, emergency stop control, and various warning lights.

Construction of the tunnel began in the R.A.E. workshops last year and erection on site began in February, 1961. The first test took place in April. It will be used by students during the present session.

Camera's-eye view through a completed section of the wind tunnel. In the workshop at Farnborough Technical College another section starts to take shape.



End views of part of the now completed tunnel showing fan section on the right.

TEACHING METHODS MUST BE REVISED

AN early introduction to relativity for students of electrical engineering was advocated by Dr. E. R. Laithwaite, of Manchester University during a discussion on "How long do we go on teaching our subject historically?"

This was held at Salford last week by the North Western Centre of the Institution of Electrical Engineers.

He pointed out that a number of physics textbooks on electricity and magnetism start with a study of permanent magnets, usually beginning with lodestones in the Chinese desert in 3,000 B.C., yet in terms of modern theories perhaps nothing is more difficult to understand than the permanent magnet.

With the advancing frontiers of knowledge, it will soon be necessary to make a more direct approach to advanced techniques, he said, without wading through the thoughts of Ampere, Volta, Faraday and Maxwell.

He also expressed the belief that there is a great future for a new subject to be called "Electrical Science Co-ordination" — the business of bringing electrical techniques in a wide variety of sciences together under a common roof to seek for common factors.

The other opening speaker at the discussion, however, Mr. P. Hammond, of Cambridge University, said that there was a great deal to be gained from studying the great masters of the past, and expressed the view that teaching could well be done by the use of examples.

EDUCATION and TRAINING

TECHNICAL TRAINING PROGRAMME DEVELOPS RAPIDLY

THE latest report of the Minister of Education shows a rapid development in the technical training programme. There were three times as many block-release courses in 1961-62 compared with 1960-61. The report, List of Sandwich Courses and Block-Release Courses, is published by Her Majesty's Stationery Office, price 6s.

The new list gives particulars of the 374 sandwich courses, compared with 332 in the previous year, and the 138 block release courses now being offered at C.A.T.s and technical colleges.

The courses range from the conventional engineering fields to the newer branches such as electronics, rubber technology, and business studies.

Approximately one third of the sandwich courses lead to the award of the Diploma in Technology or a university degree, and another third to Higher National Diplomas.

Course for shop stewards

A RESIDENTIAL course is being organised for shop stewards by the department of management at Slough College of Further Education.

The syllabus includes negotiating procedure; industrial injuries and occupational diseases; shop stewards and the law, and an outline history of the trade union movement.

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HOLLAND

Opportunities for Britain within the Common Market

That man in The Hague is needed to develop existing potential

THE Common Market challen Britain is the biggest s issue since the war.

Engineering News presen weekly survey of Britain's prosp This week's report, the fifth i series, is from Holland.

HOLLAND'S recent industrial history has some pointers for Britain — if and when she enters the Common Market. The pessimists assert that for practical trading purposes the special relationship of the Commonwealth to Britain will be lost. For the Dutch, their empire — a ready-made, favourably disposed export market — collapsed with the second world war and its aftermath of national independence movements.

The manner in which the 27 million people of Holland, situated between the North Sea and the aggressive trading expansion of West Germany have succeeded in building a thriving engineering industry is an achievement as much worth studying as the more publicised recovery of West Germany.

By 1950 the output of the Dutch engineering industries and basic metal producers had reached £276m. a year. Exports were worth £73.5 million.

Ten years later

Ten years later, in 1960, production had jumped to £1,100 million and exports had risen both in proportion and total to £380 million.

More than half the gross national product was coming from export earnings and almost half the total national income going out again to pay for imports. The parallel figures for Britain are about a fifth in each direction.

The Dutch have made these great advances with a constant pouring of money into research and by some close business agreements and liaisons.

Low tariff

In this traditionally low-tariff country, regarded by some German firms almost as a part of their home market, the engineering manufacturers have drawn together to share overheads, to increase rationalisation, to get the greatest benefit from research programmes and market research activities — with some startling results.

VMF, the £4.5 million group of twelve big firms — the United Machine Works — is as outstanding in Dutch engineering as ICI in the British chemical industry.

Individually strong performances are put up by another 20 large companies whose total combined capital is about £6 million.

And a large part of the field is occupied by some 3,000 smaller concerns, many of them producing ranges of equipment under overseas licence agreements.

ENGINEERING NEWS sends its Industrial Editor-J. D. F. Perry to report from inside the COMMON MARKET. . .

VMF has subsidiaries or agreements with companies in other countries including Belgium, West Germany and Australia.

In the vigorous expansion plans before the Dutch engineering industry there are three major openings for makers of capital equipment. And the opportunities for British producers are as good as for others.

The Anglo-Dutch Trade Council, at Raamweg 45, The Hague, provides valuable services of contact and information for its members. A valuable source of local knowledge and assistance is the Commercial Section of the British Embassy at Lange, Voorhout 32, The Hague.

The reports I have received agree in praising the quality of British engineering equipment and I have heard no complaints about prices.

Strangely, I was told by at least one Dutch engineer that "of course" British delivery dates were against us.

Since this is no longer true it is worth looking into this misconception in detail.

The facts are that over a significant range of machine tools British deliveries are now many months earlier than those quoted by West German manufacturers.

Many reliable people in key industrial positions in Europe have told me in the course of this tour that the poor British reputation for keeping to delivery dates has been largely replaced by solid performance in keeping promises.

The misunderstanding of my Dutch informant can be explained by the failure of British companies to make themselves and their abilities better known in Holland.

Too often the representative of a British manufacturer treats the Netherlands as a convenient and brief call on his way out to Europe or as a last short stop on the way home.

The convenience of the air or boat trip to Holland has helped to prevent the installing of permanent representatives to build up this substantial market.

In 1960 total Dutch imports were worth £1,624 million. Britain's share in this was 7 per cent.

Three prospects

The classification which Dutch statistics call Machinery and Transport Equipment reached a value of £370 million in 1960's imports.

The U.K. share in this was 12 per cent. The year before our share had been 15 per cent. In the first six months of this year the British share of this growing trade was 11 per cent.

Three sound prospects where British firms, I have been told, could achieve substantial expansion in exports to Holland are machine tools, contractors' plant and earth moving equipment, and aluminium products.

The Dutch labour force is fully occupied, industrial disputes leading to strikes are rare, and there is some expectation that wage increases will occur in the not so distant future under the pressure of full-employment.

In this situation there is a keen search for machines and systems that will raise the productivity per man.

New processes and fresh developments that enable the Dutch industries to maintain their high ratio of exports to total production will be brought in from whatever overseas or home source where they can be found.

NEXT WEEK

Engineering News presents a

Concluding article

on Britain's future in the Common Market including comments from some leading British companies.

Two sources

Both the U.S. and, much more heavily, the West German firms are substantially drawn on.

The heavy losses suffered in the last series of major floods led to the preparation of the scheme to link a number of the Southerly islands into a barrier against the sea forming a fresh water lake north of the Scheldt.

This should end the flood menace over a large area of Holland and the work, being paid for out of current national earnings is already nine months ahead of schedule.

So extensive a scheme, in which the costs are assessed in hundreds of millions of pounds, creates a continuous and lively appetite for much specialised equipment.

UK opportunity

Certain of the opportunities in Holland need to be taken while they are there. It was the opinion of some of those to whom I have been speaking that some sectors have gone ahead faster than the aluminium industry.

This means that, for a time at least, the highly competitive aluminium industry of the U.K. has a substantial contribution to make, and that equipment in this field will also appear in the Dutch import schedules.

One of the descriptions that the Dutch are most fond of applying to themselves is that they are naturally thrifty people.

The tendency of a Dutch businessman or executive who is doing well is not automatically to appear in a luxury car.

The lesson for the motor firms is that the medium priced and smaller models are those most likely to succeed.

It is no accident that Holland is the home of the economical Daf car, of the belt drive, although even here the larger Daffodil model is being introduced.

For greater car sales, as for increased machinery and equipment trading, the key lies in better provision of sales and service.

Service essential

Stocks of spares maintained in Holland, if necessary at more than one centre, and service arrangements which keep maintenance delays to a minimum are essential if the British share of the market is to increase and reverse the present tendency to take a smaller percentage of the larger total.

So far, Britain's partners in the European Free Trade Area have taken a more swiftly rising share of Dutch imports. While imports from Britain increased by 5 per cent last year, those from EFTA countries were up by 17 per cent.

In the same year Dutch industrial production had increased by 13 per cent and output from heavy engineering concerns by 25 per cent.

In an enlarged Common Market Area there is no doubt the Dutch would be keen to seize their chances. Their present position suggests that they will be stern competitors.

Already, the willingness of Dutch firms to combine on special problems have carried them into a useful position among the world's industrial exporters.

Good example

A recent order placed by the Port of London Authority for a £400,000 self-propelling floating crane with a 60-ton lift is a good example.

Holland Cranes, a shipyard engineering works consortium who make modern dock equipment, is a three-firm alliance.

It is made up of the Gusto shipyard at Schiedam near Rotterdam, the Verschure shipyard, at Amsterdam and the Conrad Stork engineering works at Ha

The same team have b ing cranes with lifts of u tons for Liverpool, N Manchester, Hull, and C

Active in the pursuit agreements in other n countries of the Commo it is no secret in Holland links may be expected the North Sea when the Market negotiations are

The potential success exports into Britain — Dutch exports to the U worth £58 million more goods going the other wa itself lend strength to t to bring British exports an equal level.

One famous British fi that placing its own m the Dutch market b £500,000 increase in sales.

The English manager, the firm's factories and was able to assist the loc smoothing out their d getting them proper sup the factories and seeing new opportunities w allowed to slip.

Summing u

CONCLUSIONS: The participating in BENE Belgium, Luxembourg, lands trading area) and the challenge of a new situation have immensely and modernised their The same challenges will Britain inside the E u Economic Community.

The Dutch market ne more British representati or making long stays country, if proper develo to be made of the exis potential.

The next year or two to see the Dutchman br kitchen up to date wit inflow of modern domes ances.

With appropriate stylin to local electricity tarif keen price policy British appliance manufacturers bring their sales into ac the evident goodwill of t

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DUTCH FIRMS UNIT TO CUT OVERHEA

By our own correspondent

THE HAGUE

ALTHOUGH the Dutch engineering industry is varied, it is also marked by considerable specialisation, whether by single firms or groups of firms co-operating to save overheads and to facilitate production.

The oil equipment manufacturers, for example, have formed their own organisation so that they can work in some ways on a co-operative basis, and their catalogue of production, covering 42 firms, fills 270 large printed pages.

Many other sectors have done the same.

To meet the challenge and the opportunities of the Common Market, however, the Dutch engineering sector has taken even more progressive steps, and on a much larger scale.

Earlier this year, to give one instance, the metal and electro-technical industries joined together in a new federation (F.M.E.) of employers, "To strengthen the position in the keen competition of Euromarket", especially as so many of the large industrialised lands outside the E.E.C. are trying to get a foothold in that territory.

Although each of the t retains its own o organisation to serve th of its own members, Federation is tackling all regarded as of joint i and interest.

These include econ formation like trade sta facts, export credits, an financing; fiscal queries questions covering licenc and contracts; technica foreign contracts, inclu Common Market and the Steel Community; public publicity and exhibiti social problems of staffs

The Federation repres different firms and enter each has freedom of co

Finally in addition forms of co-operation, mergers, the Dutch e industry is specialising i for underdeveloped or countries.

It not only designs a complete plants to conditions, but also subsidiaries in the dustrialising countries them to find their feet

LEASING: How to expand without getting into debt

BY OUR FINANCIAL EDITOR

THE high Bank Rate and tighter credit of current government policy have put companies pioneering leasing of industrial equipment in Britain into a situation made up equally of opportunity and frustration.

At first glance the greater difficulty of raising money and the unrelenting need for manufacturers to keep equipment up-to-date and competitive seems to assure a steady flow of new inquirers hoping to put in a new machine for a first advance payment.

This is happening. But the leasing companies are not independent of the seven per cent Bank Rate, or the pressures on credit.

The result is that new agreements have to be signed for terms related to current interest rates.

Since these are Britain's early days of industrial leasing by specialist finance companies — and the length of the machine tool companies' order books mean that much of the equipment has yet to be delivered—the scope of new business is such that it is not easy to show that credit problems are seriously retarding growth.

American guidance

For the pattern of their future development the leasing companies look to the U.S.

There, from small beginnings in the early 1950s, the professional hiring out of equipment by companies who are not themselves manufacturers has bounded up to the point where every other business is estimated to be making use of some kind of leasing plan.

As in Britain, where telephones, punched card equipment, and boot and shoe machinery have traditionally been rented by the user, there was a background of leasing by manufacturers.

What was new was the entry of the company which bought machinery, plant, office equipment, or vehicles from the makers leasing them out to creditworthy users.

Machine tools have come close to equalling all other categories of leased industrial equipment for the swift-growing U.S. firms.

In a six-year breakdown of the type of equipment rented out by the U.S. Leasing Corporation of San Francisco, California, machine tools were at the head of the list with 46 per cent.

Looking into its leasing activities industry by industry, U.S. Leasing found, in a six-year breakdown to August, 1959, that 25 per cent of its business was with the electronics products industry, almost 10 per cent with the aviation firms, 12 per cent in textiles, almost six per cent in the office machinery industry, only 3.5 per cent in the contracting industry, and even less—2.4 per cent—with the automobile manufacturers.

Cots to computers

After machine tools the order of demand for leased equipment was materials handling gear, office machinery, and commercial vehicles.

The range of leased equipment provided in North America has now extended to a computer for an aircraft firm, and advertising agency's yacht, and among 5,000 items for a new hospital, a baby's cot and a bone saw.

In Britain the companies providing leasing facilities have found a similar pattern of interest to their U.S. forerunners.

At the Mercantile Leasing Company, a subsidiary of the Mercantile Credit group, machine tools and machinery have accounted for half of all the agreements signed, and inquiries received. Materials handling equipment, commercial vehicles and office equipment come next on the list.

The Astley Leasing Company, a subsidiary of the Astley Industrial Trust of Manchester, have received most of their business from manufacturers wishing to install static machinery.

Mr. Geoffrey Biddle, general manager of the company, believes that leasing is particularly advantageous to companies wishing to conserve their capital resources but compelled in order to meet present day trading conditions to embark on a partial or complete re-equipment of plant and machinery in order to compete with the ever improving methods of their competitors.

Hire purchase for this type of company is perhaps not always attractive as it may not have the same flexibility.

What makes people rent equipment instead of buying it?

Saving on costs is one reason for leasing equipment. Equally important is the best use of the money available to a company.

A large concern with substantial resources of its own may have a totally different reason for deciding to rent rather than to buy costly new machinery.

This leaves the capital undisturbed and free for other purposes. Most company departments know what it is to work on absolutely rigid budgets.

For them a decision to spend several thousand pounds even though the equipment would swiftly be bringing in revenue might take weeks to obtain—and in the end the answer might be no.

A leasing rental, against which could be balanced the new income, might be much more easily agreed.

Good profitability

Mr. Brian Livsey, manager of Mercantile Leasing, which functions from Great Queen Street, just off Kingsway, London, places the emphasis on profitability.

"Businesses," he told me, "do after all exist to give a service or make a product, not primarily to own equipment. It is not the ownership of an asset which produces the profit. It is the use of that asset.

"Businesses existing to give a service or make a product, may find that for a minimum of cash outlay, leasing gives them the ability to realise the profit potential of the equipment they need while making advantageous use of their own capital."

Equipment leasing gives to large well-financed companies an important and flexible addition to traditional methods of finance. It will also provide valuable assistance to the small or medium size organisations in one of the more swiftly growing industries.

One thing that is certain is that the senior engineers will be aware of the rapid changes being made in plant and equipment. Leasing is able to help meet these costs.

At the offices of Astley Leasing, in a sparkling new office block in Notting Hill Gate, I was given this example:

Mr. B. Livsey Manager of Mercantile Leasing.

Businesses exist to give a service or to make a product, not primarily to own equipment. It is not after all the ownership of an asset which produces the profit. It is the use of that asset.

"A manufacturer may have come to us with a proposition. We have made our inquiries, and a five year lease has been signed on machine tools without which the firm could not expand.

"The machinery has been ordered, installed and he has made his first monthly payment. Then three years later the same manufacturer comes back to us and says, 'These machines have been overtaken by a much better model. What can you do to help?'

"The answer is straightforward. The company would agree to sell the first machines, crediting the net receipts against the outstanding rent. And under a new agreement the manufacturer would lease from us the new and more competitive equipment."

These are the views of those who have experience of leasing. How quickly is the practice growing?

Astley is a lively infant, only a few months old. Mercantile, also vigorous, are not much senior, they started life 18 months ago, and include in their parentage the big U.S. Leasing, of California.

Growing interest

Neither is ready yet to talk about turn-over. Brian Livsey of Mercantile, says: "We have been pleasantly surprised at the willingness of managements in all sizes of companies, to discuss and investigate the new idea, and growth has exceeded expectations based on the experience of our American associates when commencing operations in Canada."

U.S. Leasing piled up Total Lease Receivables from $19,100,000 in 1957 to two and a half times that amount, $48,594,000 last year.

For U.S. Leasing the idea started in 1952 when Henry Schoenfeld, now senior vice-president, was managing a small food-processing plant in California.

Constant trouble with an overworked fork-lift truck and a cash situation which did not allow him to go out and buy a new one, lead to a dealer's offer to lease Schoenfeld a fork-lift truck for three years.

Small beginnings

From there it was a logical step to discuss the move with two executives in another processing plant. This firm needed $500,000 worth of equipment but was not so keen to buy it.

Schoenfeld, the two executives, and a fourth companion put up $5,000 each and got a five-year loan from the bank to cover the $500,000 order. U.S. Leasing had begun.

In Britain the stumbling block which has caused some inquirers to abandon their first interest has been not owning the equipment. This is an attitude which may change with time.

'Plastics tests should be re-appraised'

PRESENT and future uses of plastics and reactions to stresses and strains formed the theme of papers read at the Plastics Institute Conference in London on Tuesday and Wednesday.

Professor H. Ford, Imperial College of Science and Technology, dealt with problems facing the wider use of plastics for stressed components.

At present, performance could not be predicted with the same confidence as for metals. He suggested that tests for plastics needed re-appraisal and felt that those applied to metals may be adaptable.

An effort in this direction was necessary in order to give confidence to an engineer considering the use of these materials.

The railways favour the use of plastics because of their resistance to fire and weathering. Mr. E. D. Henley, of the British Railways Research Dept., gave details of applications in a carriage door and signal relay room.

He also discussed the feasibility of a plastics passenger coach.

Below: part of a 400ft. length of 12in. Hipact pipe, used for acid effluent from the Barry factory of British Geon. The anti-shatter pipe is made by Extrudex.

The transfer of force into highly stressed monocoque bodies out of glass-reinforced plastics was discussed by Professor U. Hutter, of Stuttgart.

The advent of very thin glass fibres with greater flexibility has given rise to a loop technique.

Glass fibres in a plastic can now be bent endlessly around the joint elements by a special winding process, thus forming joint flanges out of a row arrangement of strang (rope-like) loops.

The course of the cross-sectional area may be shaped so that a length-balance occurs between the strangs near the joint bolts and those radially further apart.

This results in a more uniform stress distribution due to a more balanced load.

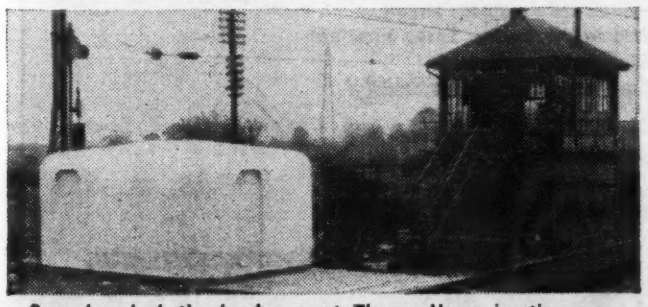
Application of the loop technique allows the design of non-circular shaped flanges and it is valuable in making propellers and helicopter rotors.

Mr. A. W. Rawe, Microcell, dealt with environmental testing, and means of predicting long-term strength from short time tests were reviewed.

Prolonged loading of reinforced plastics, with special reference to piping, was covered by Mr. A. W. Thompson, Bristol Aeroplane Plastics, in terms of fatigue and creep properties.

Chemical engineers are making increasing use of plastics and the uses of polyvinyl chloride, polyethylene, polystyrene, and polyester-glass laminates were described by Dr. E. F. J. Tomalin, Distillers Co.

Future developments in this field are possible by giving special attention to factors peculiar to the application.



Prepackaged plastic signal room at Thames Haven junction compared with the usual type.

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ENGINEERING NEWS

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Thursday, November 2, 1961

A lesson from Henry Ford

IT is fashionable these days to talk of creative thinking, but vague exhortations to increase creativity in engineering are limited in effect and tend to pall with constant repetition.

The argument that engineers must necessarily be creative if they are concerned with the manufacture of products is only true provided they are making better things for better living.

But in fact real creativity goes much deeper and involves an attitude of mind in dealing with problems.

☆

Engineers are usually dealing with specific problems which must be solved by definite answers and this very fact often breeds a narrow outlook. Ingenuity, which can sometimes be synonymous with creativity, leads to the solving of several problems at once—this is often called "thinking big".

There is a story that the late Henry Ford would not accept parts or materials from his suppliers unless they were packaged to rigid crating specifications.

These specifications included close tolerance on dimensions as well as the quality of the wood in the packing cases.

On receipt, the crates were carefully pulled apart and without further cutting or fitting were used as floor boards on the Model T Ford.

☆

This story is told by Prof. D. S. Pearson in a book called Creativeness for Engineers, which has just been published in its fourth edition.

This book, published by Edwards Brothers Inc., Michigan, is a serious attempt to do something positive about teaching engineers the art and science of creativity and it will appeal to many of them, if only because the nature of creativeness is expressed in the form of a second order differential equation!

It is, however, clearly useless to produce a seed of creativity by our teaching methods if we do not have a fertile field where it can grow in industry. It seems the soil is pretty thin in places.

Tomorrow's technology

TIDAL power will, in the not too distant future, become a reality. It is probable that the first full scale tidal power station will be completed in Russia or France.

The first Soviet design has already been completed and although this station will only generate 1600 kW it can be considered a pilot project for a more ambitious programme.

Design of a 1,300,00 kW station has already started and a station of 14,000,000 kW is considered feasible.

In order to overcome the problems of peak demand at times which coincide with unsuitable tides, a pumped storage scheme using reversible generators will be an essential part of most tidal projects. — SCANNER.

An Engineer's DIARY

Are we simply cutting our own throats?

WHEN in Holland a few days ago I saw the Fokker Friendship, the plane that is replacing the old pack-horse of the air, the Dakota, in many parts of the world.

The Fokker factory on the borders of the Schiphol Airport near Amsterdam has, in fact, just booked its 200th order for this Dutch aircraft, and seems to have many more in the offing.

Now this, I was surprised to learn, should be good news for British industry, too. Why? Because about 40 per cent of it is composed of British components, while when it comes to replacements of rotating parts the ultimate British share of its value during its lifetime is about 60 per cent.

When specially designing it to carry 45 passengers for relatively short-ranged routes of 600 miles and to operate off rough airfields under difficult conditions, the Fokker Company once again turned to Britain (as it has been doing during all the 40 years of its existence) for its main components.

Famous names

ITS engines are by Rolls-Royce; its auto pilot by Sperry and Smith; its instruments by Smith, Sperry, Kent, Murphy, Kent and Sangamo Weston; its fire equipment by Graviner; its high-energy units by B.T.H.; its retractable undercarriage by Dowty; its four-bladed propellers and wheels by Rotol; its anti-skid brakes by Maxaret; and its pneumatic system and tyres by Dunlop. Its design, too, was largely based on the British Redux metal-bonding system.

Of the 54 different types of aircraft developed by Fokker, 35 have been powered by British aero engines, and of the 15 Fokker airliners, 12 have been equipped with British engines.

Yet, Fokker complains, the Friendship plane still has to pay a 17 per cent tariff into Britain, whereas BOAC does not pay any tariff at all on its imported American aircraft.

Man's world

SPEAKING to Miss M. Griffith, head of the heat section at the Electrical Research Association at Leatherhead the other day, I was reminded that very few women occupy positions of responsibility and influence in the engineering profession.

Miss Griffith, B.Sc., F.Inst.P., who is a physicist by choice, has done considerable research into heat pumps in the past and presented several papers to engineering institutions on the subject.

Her work includes such developments as the provision of heating schemes for homes and industry, and she is at present devoting her energies to the provision of off-peak space-heating with electrically warmed floors.

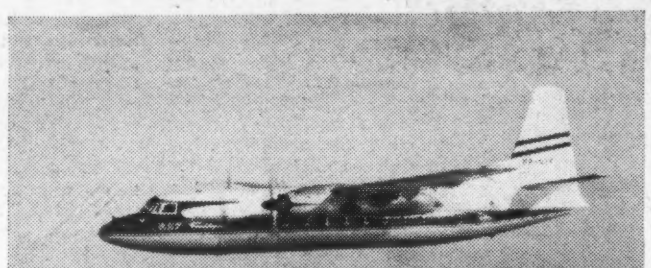
Shooting gallery

VISITORS to the Babcock & Wilcox tubular products division's booth at the 1961 National Metal Exposition at Detroit's Cobo Hall will be able to "have a go" at a unique Electronic Shooting Gallery.

This display features a special shotgun that shoots light beams at light-sensitive electronic targets.

The provocative game stimulates interest by combining a challenge to the visitor's product knowledge—he has to fill in a form first—with the always popular urge to "bang-away" at a target, even if the missile (light beam) is noiseless and harmless.

Participation is the important thing, and token prizes will be awarded all contestants.



F27 Fokker Friendship in flight — 40 per cent of the parts are British.

Notes pay off

IN my student days I was repeatedly told to make notes of every experiment, conversation, or experience.

No doubt thousands of students are told this every year, but I wonder how many of them acquire this note-making as a lifelong habit.

I recently met Mr. Wilfred Duckett who retired two or three years ago after a lifetime's experience in the manufacture of electric traction motors.

He told me that for over 40 years he has been collecting notes, not only of his own experiences but also those of other people.

Using these notes as a basis Mr. Duckett has recently completed a book on the insulation of traction motors, and he is now starting a second book on the mechanical aspects of motor manufacture.

Come to think of it, it's about time I started collecting my own notes!

Piece for peace

THOSE who have had some experience of recruiting research staff may well think that the first task of Energy Conversion Ltd., the new fuel cell consortium (story front page) which is to gather together its research team, may be one of its most difficult.

Staffing problems confront almost all of those responsible for research in industry and no one is expecting that the new organisation will find the situation much easier.

The executives concerned have told me this week that it may be between four and six months before the nucleus of men of the ability equal to this kind of project are selected and ready to begin.

One ray of hope exists. Just as once upon a time to be a nuclear physicist was the height of graduate ambition, so now to be an electro-chemist and devise useful forms of the fuel cell may become the ambition of those now qualified or deciding on their post-graduate studies.

There is after all a peaceful suggestion about the fuel cell. Nobody is likely to march to Trafalgar Square crying "Ban the Fuel Cell"

P. of the BACIE

IN addition to his many other roles, Sir Willis Jackson was recently elected president of the British Association for Commercial and Industrial Education (BACIE).

Sir Willis is widely known both in industrial and academic circles. He has a wide experience of education and engineering research and serves on a number of national committees and councils.

Last year he was president of the Institution of Electrical Engineers and this year is president of the Association of Supervising Electrical Engineers.

He was educated at Burnley Grammar School and Manchester University. Since then he has moved between the research laboratory and university or technical college.

Sir Willis left AEI (Manchester), where he had been director of research and education since 1953, at the end of last month to take up the post of Professor of Electrical Engineering at Imperial College for the second time—the first time was from 1946 to 1953.

John Heywood

SOVIET ENGINEERING

by our own correspondent

The two Mr. K's ag at the 22nd Congre

A CALL for the organisation of unified scientific - research establishments was made by Academician Keldysh, the President of the USSR Academy of Sciences on October 21 at the 22nd Congress of the Soviet Communist Party.

His aim is to avoid the dissipation of scientific effort in a multitude of small research institutes.

The situation has arisen in the past, and apparently still exists, that in one town computer centres have been set up by the branch of the Academy of Sciences and the local university, and he wishes to avoid "building everywhere such costly installations as reactors, powerful particle accelerators, and observatories."

He concluded: "It is better to have layer unified institutes furnished with the latest equipment and staffed by specialists capable of contributing something new to science than to dissipate resources on the construction of small research institutes."

At this point, Mr. Khrushchev interjected "Correct" and delegates applauded.

* * *

There have been frequent references in the Soviet technical and economic literature recently to a subject called rotary automation.

Without giving details of the actual operation of a rotary automation system, it has been claimed that the use of this system has the greatest future in regard to production line work.

The inventor, or the designer responsible for the ideas behind it, L. N. Koshkin, defines the system as being built up of rotary machines whose characte that the operations are c in the machines in the c continuous combined of the work-piece and t

Mr. Koshkin claims advantages of the syste it is capable of guarante productivity independent duration of the operatio

An engineer from th mental Research Insti Forging-Pressing Engine proposed in a letter to omic Gazette a couple ago that the reorganisati Likhachov Automobile P Moscow which is current should be based on rotary lines.

* *

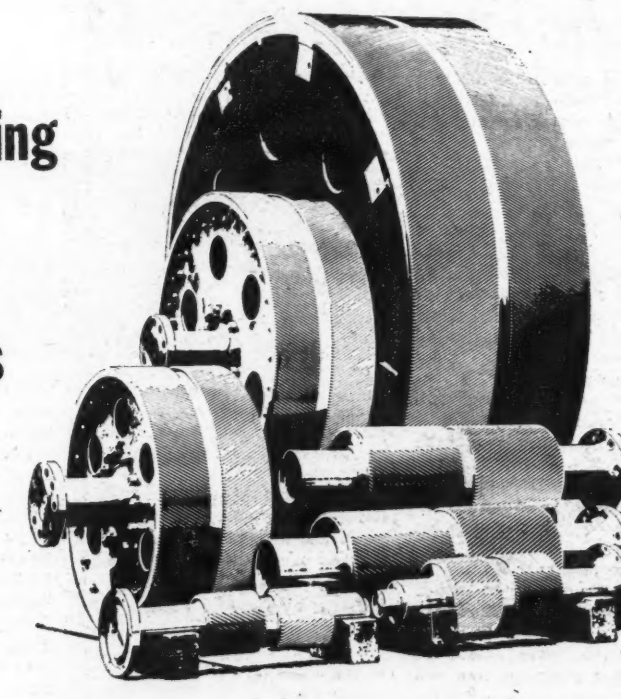
An automatic described in greater de despatcher - productio troller designed and bui Leningrad Institute for Mechanics and Optics, is to be in operation in the pressing shop of the Kramatorskii engineering

The installation em forms of communication speaker radio, telephon sion. It is claimed that unit simplifies the proble trolling the production p facilitates the equal loadi production machinery.

It also enables better made of the capacity of and cuts down on the d the processes.

It is claimed that the in not only record idling give advance warning o ing changes in the proc of the necessary prepar the next cycle.

gearing for ships



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FAULT ALERT SYSTEM FOR AUTOMATED PLANTS

A RELIABLE system for monitoring and indicating faults in any automated process has been developed by Gresham Automation of Hanworth, Middlesex.

Designed entirely in the "solid state", that is, transistorised with printed circuitry, no mechanical failure can arise as there are no moving parts.

The fault warning system can be easily adapted to service any desired number of points of a plant and it will give audible and visual alerts, either in a control room or at the fault location.

It will indicate when corrective action is being taken and, if desired, record discrepancies which have corrected themselves.

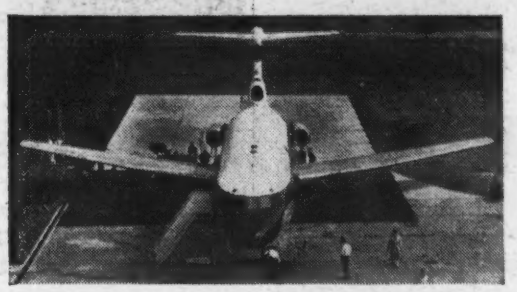
With its low current consumption the system can be powered from any low voltage d.c. source.

Proteus top 2m. hours

PROTEUS ENGINES installed in Bristol Britannia aircraft have now completed two million revenue hours flight.

In this time more than 150 million miles have been flown, with more than 2½ million passengers. Not a single Britannia passenger or aircrew member has been killed or seriously injured.

SPEY JET UNDERGOES FLIGHT TEST



Three Rolls-Royce Spey by-pass jets are here mounted on a de Havilland Trident. Ground running trials have been completed.

Two engines tried out on the Vulcan

AN important stage in the development of the Rolls-Royce Spey by-pass jet engine was recently reached when flight trials began with two Speys installed in the inboard nacelles of an Avro Vulcan test-bed aircraft.

These trials came less than 10 months after the engine had first run.

During this time a great deal of endurance and performance testing has been completed and running time on test engines now totals over 1,300 hours.

This includes a preliminary 150-hour run to the combined Air Registration Board and Federal Aviation Agency type-test schedule.

The engine has a take-off thrust of 10,000 lb. and has been designed for outstanding operational economy—low fuel consumption, low maintenance costs and a long overhaul life.

The first new Spey-engined aircraft to fly will be the de Havilland Trident; 24 of these three-engined airliners are on order for British European Airways.

The British Aircraft Corporation's One-Eleven airliners, ordered from the drawing board by Braniff International Airways, U.S.A., and British United Airways, will each be powered by two Speys.

Trident pod test

In addition to the normal development bench testing, the test work has included extensive endurance running in a fully-equipped production standard Trident pod.

Here, the relevant power and air offtakes for ancillary purposes have been applied and checks carried out on the functioning of the thrust reverser and silencer.

Valuable data

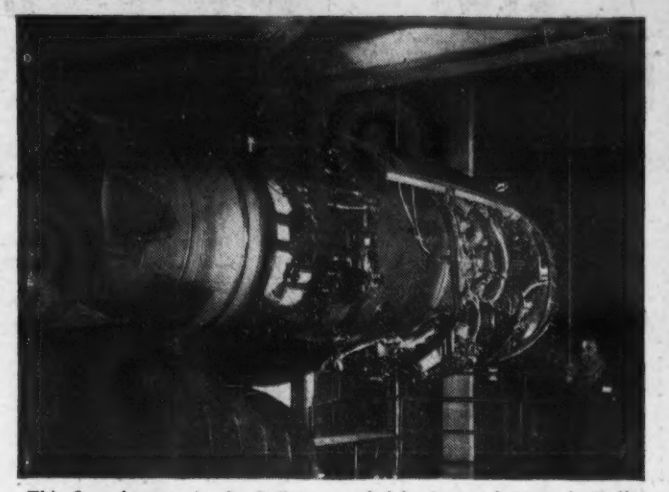
Included in this pod testing, which has been performed at Rolls-Royce Flight Development Establishment at Hucknall, Notts., has been a 150-hour cyclic test.

This has provided valuable experience on the Spey and its installation features in the Trident.

The One-Eleven has a similar pod installation for its two Speys. Compatability tests have also been made with a Spey fitted with the Trident centre intake.

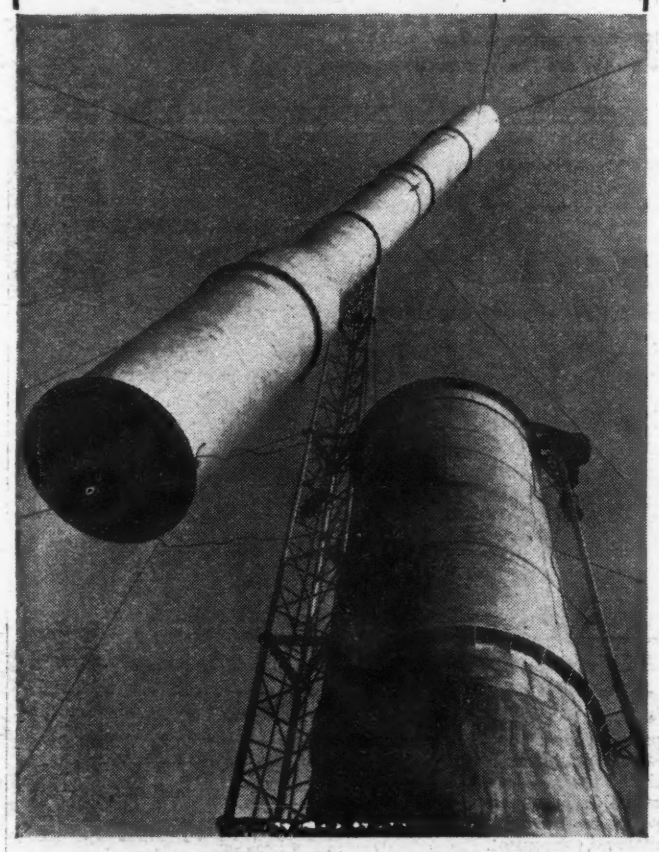
Initial flight testing was preceded in August by tests in Rolls-Royce high-altitude test facility which is capable of reproducing the full range of flight conditions required of the civil and military versions of the engine.

Testing in the ATF has included checks on relighting over a range of altitudes, and investigation of the engine's windmilling and flight idling r.p.m. under varying conditions.



This Spey by-pass jet by Rolls-Royce is seen here undergoing an endurance test. It is mounted on the engine pod of a de Havilland Trident.

WORLD'S TALLEST ALUMINIUM CLAD CHIMNEY GOES UP



The world's tallest aluminium-clad chimney—150ft. high, built by F. E. Beaumont—is seen here being erected for the Southern Gas Board at Southampton.

A STEEL chimney stack, clad with aluminium, has recently been installed at the Southampton works of the Southern Gas Board. Designed, manufactured and erected by F. E. Beaumont, Ltd., of London, this stack is the latest of over 300 made by the company using this technique, and measures 150 ft. in height.

Heat losses are minimised by the reflective surface of the aluminium casing while losses by conduction are reduced by the air gap between the steel and aluminium surfaces. By reducing the temperature gradient in the gas stream between its point of entry and that of its emergence to atmosphere, increased life is claimed, due to elimination of aggressive acid condensate on the interior steel surface.

For the cladding, 16-gauge sheet of BA.60 alloy is used with flange covers in roll-formed super purity aluminium supplied by the British Aluminium Co. A full proofing test will soon be undertaken at Southampton on the boiler system, of which the stack forms a part. Figures showing top and bottom temperatures of the gases will probably be available.

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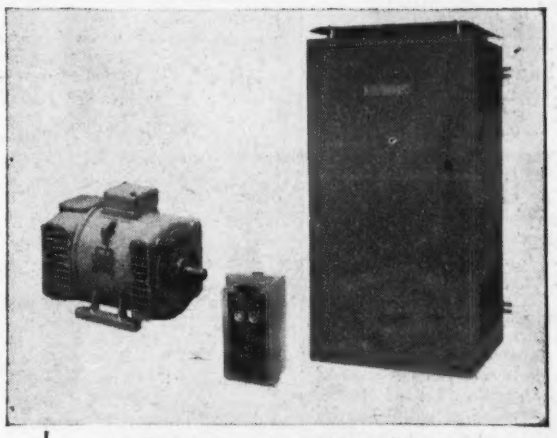
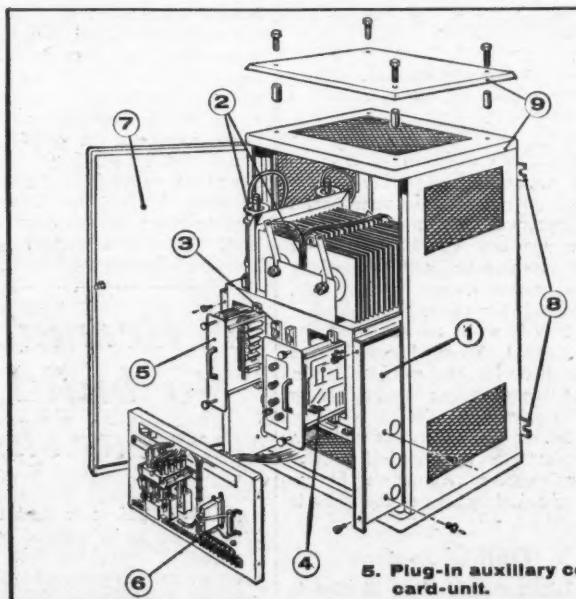


COMPLETE SERIES B.M.C.1 DRIVE EQUIPMENT *is ready-to-fit, needs only connecting wires. Remote control station provides pushbutton starting, reversing and fingertip speed setting.*



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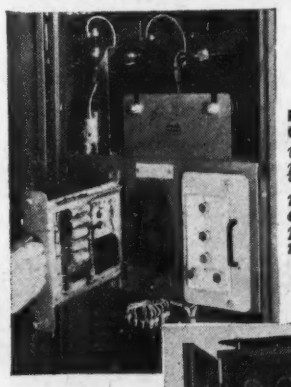
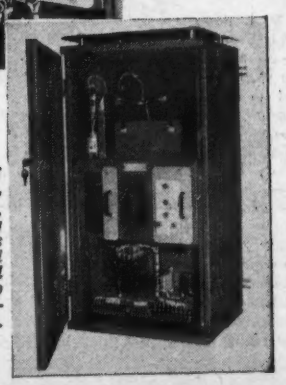


FULLY UNITISED CONSTRUCTION, *using plug-in printed circuit 'card-unit' techniques, gives economy of production and maintenance.*



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.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

U.S. MAY COLONISE THE MOON IN SIX YEAR

General Electric put plan to U.S. Government

NEW YORK

A PROPOSAL to establish a self-sufficient colony on the moon in 1968 has been made by the U.S. General Electric to the United States Government.

According to the company, no additional major technological breakthroughs are required to soft-land 200 Saturn vehicles, with 500,000lb. of equipment and 10 lunar pioneers, within the decade.

Lunar vehicles

A pre-colonisation exploration programme is outlined in the proposal, including lunar orbiting spacecraft for mapping, lunar impact craft for exploration, soft landing vehicles for exploration and site preparation, and spacecraft to test ability to land on the moon and return.

Actual colonisation would begin after a site on the moon had been selected for the soft landing of men and equipment.

The first vehicles would consist of lunar landing vehicles, loaded with all essential material necessary to establish a lunar settlement. After telemetry had indicated that the first vehicles had landed safely, men would follow.

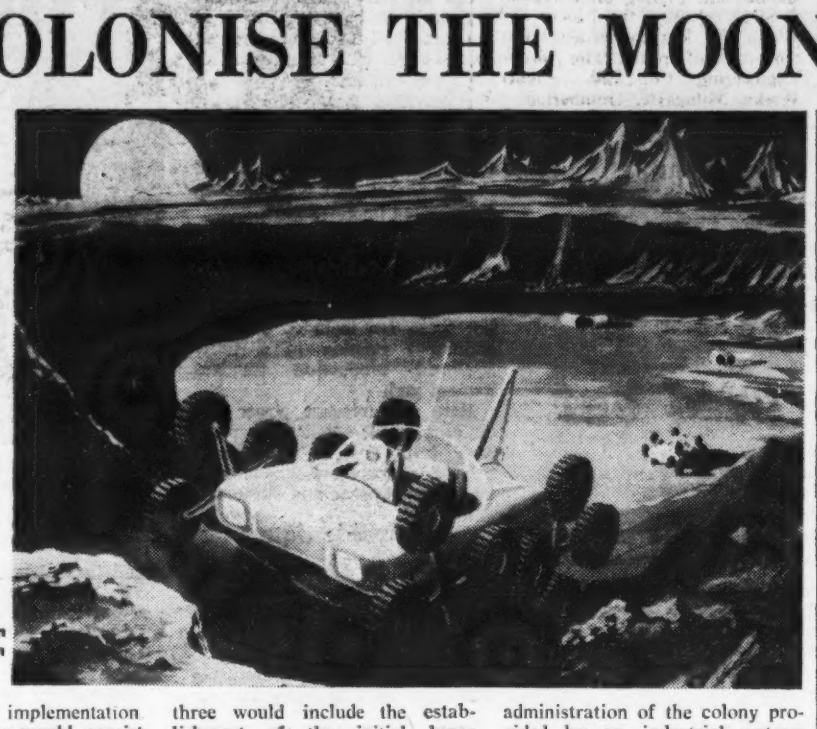
Self-sustaining

Landing vehicles would be of a modular design so that they could be assembled on the moon to form housing for living quarters, mess facilities, laboratories, shops, power stations, recreation and storage units.

The base would be self-sustaining for as long as a year. The original 10 colonists, who would help determine the requirements for establishing a permanent colony, would assemble earth return vehicles from building block propulsion components previously delivered to the site, and consisting of earth re-entry capsules, and rocket engine assemblies. The low gravity of the moon (one-sixth that of the earth's) would help make this task easier.

Preparatory study

The programme would begin with a six-month intensive study, directed by the United States Government and accomplished by an industrial contractor, to corroborate estimates made by General Electric and to formulate comprehensive plans for implementation. The second phase would consist of a six-year period of development, proving techniques and equipment, and training. Phase three would include the establishment of the initial lunar colony, directed by the Government, with services for launching, supply maintenance and administration of the colony provided by an industrial systems manager.



Artist's conception of exploration car, assembled on the moon's surface.

General Electric have proposed immediate adoption of the programme. Their target is 1968.

In addition, an automatic space landing system to guide in unpowered space vehicles and reusable first-stage booster missiles for a normal landing is being developed by U.S. General Electric.

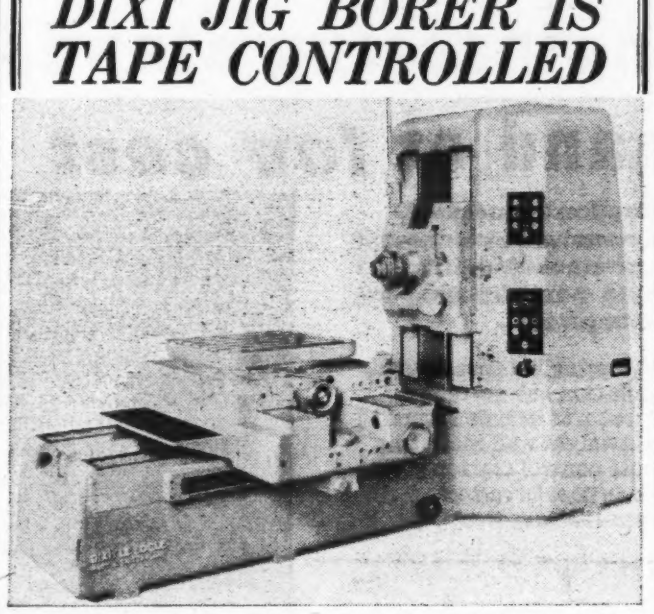
The automatic landing system, which uses a computer and radio commands for guidance, would enable such vehicles gradually to dissipate the inertia of re-entry, yet land accurately. In the landing system, radar will create a "window" in the vehicle's line of flight. This "window" would be seven miles high and 60 miles wide.

Controlled landing

After the space vehicle re-enters the atmosphere it will fly through this "window" and from that point would be in direct communication with the landing system equipment on the ground.

When the space vehicle is about 500 miles from the landing site, its radio signal will be picked up by radar. Information supplied by the radar will be fed into a computer which will then be able to select the precise safe flight path to avoid overheating or overstress of the vehicle. The landing system, which will bring the vehicle in at about 70 miles per hour, will use equipment currently in production at General Electric. Over 100 landings have already been simulated with various systems on an analogue computer.

DIXI JIG BORER IS TAPE CONTROLLED



The Dixi 3S horizontal optical jig borer. A versatile machine, with precision rotary table, for automatically milling and boring several faces of a workpiece.

BERNE

FURTHER details of a Swiss horizontal jig borer for machining workpieces on five sides automatically by tape control to an accuracy of 0.001 mm or 0.00005in. have been released by the manufacturers, Dixi S.A., Usine 2, Le Locle, Switzerland.

Fitted with an electronically controlled Ward Leonard type spindle drive, the machine has a fully transistorised control system with printed circuits.

Setting is made manually in conjunction with optical projection screens. Automatic hydro-mechanical locking of the slides is provided.

Optical system

Direct numerical positioning is by means of a keyboard or with punched tape.

Automatic fine adjustment incorporates an optical system which magnifies a division on a fine scale and projects it through a special graticule on to an electronic reading tube.

The graticule has one hundred divisions and the reading tube measures the distance from the beginning of the graticule to the division of the precision scale by electronically counting the lines of the graticule.

The final accurate positioning is done by "electronically shifting" the graticule in steps of 0.00005in.

W. Germans to build nuclear ship

KIEL

ALTHOUGH it was not expected to be ordered before the end of 1962, the first West German nuclear-powered ship is now to be built at the Keiler Howaldtswerken AG Shipyard, Kiel.

The vessel is designed for the transport of bulk cargoes but will be used basically for research purposes. It will be equipped with the necessary laboratories, as well as accommodation for the crew of 120, including scientists and technicians.

The keel is to be laid next year, and with an estimated building time of two and a half to three years it is expected that the vessel will go into service under the German flag some time during 1965. It will be powered by an organically moderated reactor.

HANDLING SULPHUR I MOLTEN-STATE CUTS CARGO-LOADING TIM

NEW YORK

THE introduction of pumps capable of handling sulphur in its molten state heated to a temperature of 275°F. has speeded up the loading and unloading of sulphur cargoes in American ships.

The liquid chemical is pumped directly from heated shore tanks into the cargo vessel in a fraction of the time normally required to handle a solid shipment.

First ocean-going tanker devoted exclusively to the transportation of molten sulphur, the s.s. *Marine Sulphur Queen* is now delivering cargoes from the Texas Sulphur Co. plant in Beaumont, Texas, to molten sulphur terminals at Tampa, Florida, Norfolk, Virginia, and Carteret, New Jersey.

Steam-heated tanks

Owned by Martine Transport Lines, Inc. of New York, the 523ft. converted tanker can carry 15,100 tons of molten sulphur in special steam-heated tanks.

Eight vertical turbine pumps, designed by engineers of Fairbanks, Morse & Co., U.S.A., lift the hot cargo up out of four shipboard tanks and transfer the liquid to storage facilities on shore.

Each of the 10 inch four-stage pumps has a rating of 650 gallons per minute, against a 140ft. total dynamic head.

The bowl assembly, disc box, discharge column and charge head are completely s jacketed to maintain the su at its proper temperature.

In other respects constructi the pumps is standard cast carbon steel, with stainles bolting. The bearings are cast iron, lubricated by the sulphur.

Non-magnetic Ti Ni alloy

SILVER SPRING

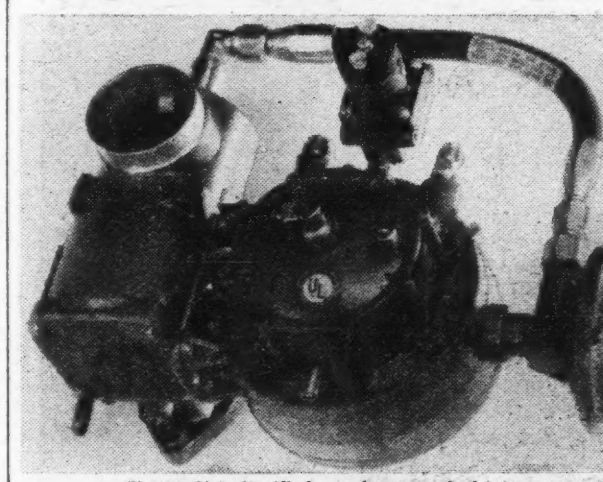
A NEW non-magnetic with promising characte has been developed by Navy scientists. Called Niti is based on an intermetallic pound of titanium and nick

As well as being non-mag this new material is corrosio sistant, strong and tough. be hardened to 62 Rockwell almost the hardness of tool and an impact strength of 43 pounds is claimed.

An unusual property is th toughness increases as tempe decreases and yet it can be at temperatures up to 650°

It has been suggested as a able material for making magnetic tools needed in disposal and other under ordnance work.

L.P.G. injectors increas engine life by 500 p.c



The McClain liquified petroleum gas fuel injector.

WESTFIELD, N.J.

ONE of the original developments in the use of liquified petroleum gas (propane or butane) in an injection system of carburetion is the McClain, which is now available in several sizes to suit petrol engines up to 650 cu. in. engine displacement.

Use of this type of gas fuel has a number of advantages. Propane burns clean with much less objectional odour and carbon monoxide in the exhaust.

Longer life

The average engine under heavy use is said to last up to five times as long using propane as the fuel against petrol because propane has much fewer carbon-forming additives to foul sparking plugs, valves, etc. Since propane enters the combustion chamber as a gas (rather than semi-liquid as petrol does at idle speeds) there is no washing down of cylinder walls that removes the oil film, and increases wear.

Since no liquid petrol or contaminants in the petrol reac oil in the engine crankcas bearing life is longer and th of the oil is greatly increas

McClain equipment has used to replace conventiona gas conversion systems in locations in several countri comparison tests. These test conducted by many large ind plants and fleet owners, pendent of the manufactur the equipment. Each test, fuel records were kept befo after installing McClain ment, showed a saving of cent to 35 per cent in L. consumption with the use McClain injector system o buretion. Other favourable were reported — quicker st better acceleration, more and smoother operation.

Further information o McClain L.P. gas injector obtained from the export Peacock Corporation, P.O 268, Westfield, N.J., U.S. from their English distr Normac, Ltd., Pepper Road let, Leeds 10, England.

SMITHS for Constant Speed Timing Motors

What are *your* Timing Motor needs? Wide choice of speeds? Versatility in use? High quality? Long life? Reliability? Right price? Then choose a Smith's 'Sectric' unit—self-starting, slow speed (200 R.P.M.) permanent magnet rotors with saturated oil retaining bearings fed from supplementary reservoirs, and robust machine cut reduction gears in dust resistant housings. Smiths Constant Speed Timing Motors are C.S.A. approved, flash tested, and made by SMITHS—the name with a world of meaning. *Write or telephone now for full details and any special information you require.*

SMITHS CLOCK & WATCH DIVISION

Contracts Branch: 179 Great Portland Street, W1 *Telephone:* LANgham 5811
Overseas enquiries to Sectric House, London, NW2, England *Telephone:* GLAdstone 6464

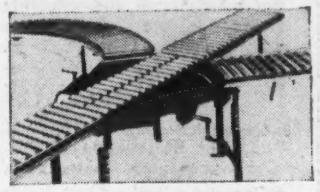
NEW Equipment

Flexible curves for conveyor switching

THESE Rapistan flexible roller conveyor sections permit 45 deg. switching in either direction. They are intended for 12in., 18in. or 24in. gravity or power conveyors and are made in three main types: three-way, Y, or spur switching.

The three-way model will divert materials to the left or right, or allow it to go straight ahead. It can also be used to channel material arriving from three different directions on to a single line. The Y switch model diverts materials to right or left only, and the spur switch model allows materials to go straight ahead and either to the right or left. Switching may be performed manually or by remote control using electric motors. **The Manufacturers Equipment Co. Ltd., Sutton Road, Hull, Yorks.**

Reader service reference No. 139



FLEXIBLE CURVES
Can be remote controlled

Automatic bar feed

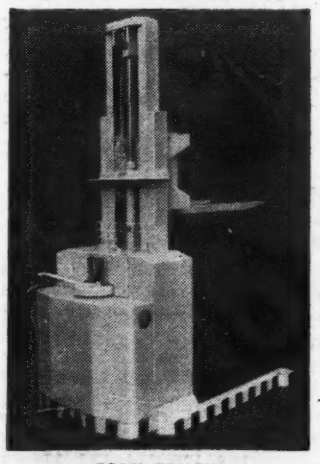
An automatic bar feed unit has been produced for use with Taylor sawing machines. The only fitting required is the drilling and tapping of holes in the side of the sawing machine for the attachment of a connecting bracket. The magazine takes 10ft. bars up to 2½in. diameter, and can be loaded while the machine is operating.

Bar is fed to the stop automatically each time the clamp is released by the foot pedal until the bar is exhausted. The pusher rod then goes back to the other end of the feeding channel, a new bar drops in and the traverse stops, allowing the operator time to remove the old stub before starting on the new bar. **Charles Taylor (Birmingham) Ltd., Bartholomew Street, Birmingham, 5.**

Reader service reference No. 140

Fork truck

Two versions of the Straddlestack are available: the SS 12/15, with a lifting capacity of 1,120lb.; and the SS 15/20, with a capacity of 1,500lb. The lifting ram is controlled by a lever valve which



FORK TRUCK
Battery driven

gives complete control of the load at all times. A relief valve protects the pump unit against overload, and a flow control valve is fitted at the lower end of the ram to limit the downward speed of the load.

Steering is controlled by a tiller arm, which also operates the band transmission brake. The steering assembly is mounted on a ball bearing turntable and turns through 180 deg.

The larger machine has a length of 52in., a turning radius of 49in., and is fitted with 36in. forks, while the smaller model is 47in. long, has a turning radius of 45in., and is fitted with 27in. forks. Both give a maximum height of lift of 108in. and are 36in. wide. Speed of lift when loaded is 30ft./min. **The Montgomerie Reid Engineering Co. Limited., Bramley Green, Hants.**

Reader service reference No. 141

Magnetic vice jaws

High impact plastic is used for the manufacture of Speetol soft magnetic vice jaws. Permanent magnets are moulded into the plastic to give instantaneous fixing and the jaws are made in three sizes to cover vices from 2in. to 7in. wide.

The jaws can be moulded to grip odd-shaped components by merely heating up one of the parts, clamping it between the jaws and allowing them to cool. This procedure gives a permanent impression of the part to be gripped. **Speed Tools Ltd., Vereker Buildings, Gresse Street, London, W.1.**

Reader service reference No. 142

Ear protectors

This headphone type ear protector has been developed for operators working in conditions where the level of noise is so high that permanent damage to the hearing could occur. It is provided with fluid acoustic seals, detachable ear shells and a replaceable headband cover. The protectors are said to be comfortable to wear and simple to adjust. **Amplivox Ltd., Beresford Acenue, Wembley, Middx.**

Reader service reference No. 143

Lifting device

Latest model of the Tirfor pulling and lifting machine, the T.7, weighs only 13lb., and has a lifting capacity of 15 cwt. It consists of a pressed steel casing through which passes a length of high tensile wire cable with a hook at one end. The hook on the wire is attached to the object to be moved or lifted, the casing is attached to any convenient anchorage, and movement is achieved by operating a detachable telescopic handle which fits on to a lever projecting from the casing.

Inside the casing are two pairs of smooth faced steel jaws which move backwards and forwards in opposition, alternately taking the load. The T.7 can be used for loading equipment on to lorries, moving heavy objects in workshops, installing machinery, tensioning cables, and many other applications. Each machine is supplied with 30ft. of cable and a cable reel. **Tirfor Ltd., 27 Broomgrove Road, Sheffield, 10.**

Reader service reference No. 144

Trailer supports

A load of 30 tons can be raised or lowered with ease by the Adrolic supports designed for fitting to semi-trailers. This considerably lightens the task of raising the front of the trailer to permit coupling of the tractor, should this be necessary.

Lifting is accomplished by hydraulic gear. There is a two-speed hydraulic pump which changes speed automatically as it takes up the load and a separate mechanical lock ensures safety even if the hydraulic system should fail. Pulling on a control handle releases the lock and allows the legs to retract under the action of springs. **The Adrolic Engineering Co. Ltd., Clober Works, Milngavie, Dumbarton.**

Reader service reference No. 145

Turret punch press

Two new models of Edel multiple turret punching presses have been developed for such work as the manufacture of radio chassis. A number of different tools are mounted in the machine at the same time and each one is swung into position over the work as required. Equipment for working from templates is provided and the machines can also use drawings as templates. The position of each tool can be adjusted independently.

Model SM3 has a rating of 4 tons, a throat depth of 19¼in., and can be equipped with 12 tools to punch holes up to 13/16in. diameter in 16 S.W.G. sheet, or up to ¼in. diameter in 12 S.W.G. The SM15 model has a 15-ton rating, a throat depth of 19¼in., carries 18 tools, and will punch holes up to 3½in. diameter.

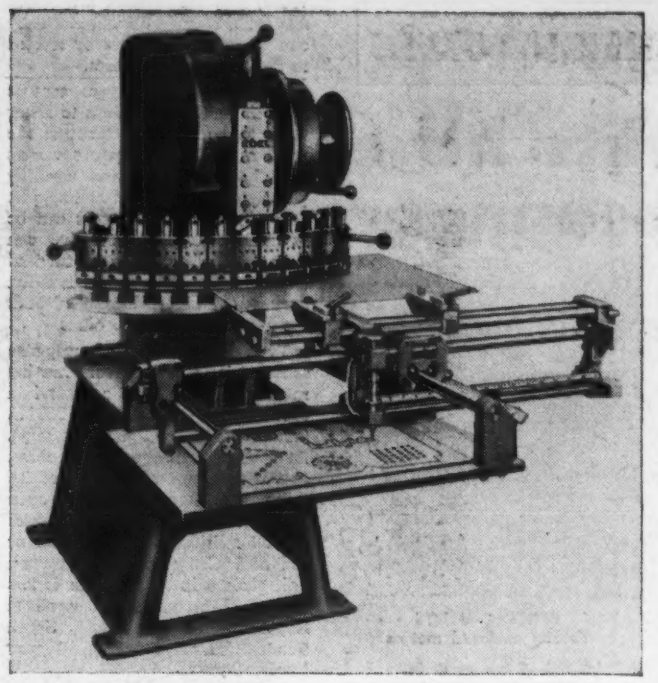
When using a template, a hole is engaged by a selector pin which makes an electrical contact and engages the magnetically operated clutch so that a hole is punched. For a one-off job the table can be set by means of graduated scales. **F. J. Edwards Ltd., 359 Euston Road, London, N.W.1.**

Reader service reference No. 146

Three-speed mixer

Twin planetary beaters in the Commodus 55 mixer can be used either together or separately. The machine is designed to mix all types of semi-paste or semi-liquid products and has three operating speeds: 15, 30 and 45 r.p.m., power being supplied from a 1 h.p. motor. The mixing pan is mounted on castors and provision is made for it to be raised and lowered by means of a hand wheel. It can be of either tinned steel or stainless steel and has a capacity of approximately 50 litres. **The Flexile Metal Co. Ltd., Bessemer Drive, Stevenage, Herts.**

Reader service reference No. 147



TURRET PUNCH PRESS
Up to 12 tools

Level indicator

Offering the same simplicity of measurement of tank contents as a dip stick, this magnetic level indicator can be used while a tank is still sealed, thus it is particularly suitable where radioactive, corrosive or inflammable liquids are involved, or liquids which must be kept free from contamination or oxidisation by the atmosphere.

A tube is let into the upper or lower face of the tank, the inner end of the tube being closed while the outer end is open to the atmosphere. A metal or cellular plastic float fits round the outside of the tube and is free to move up and down as the liquid level rises or falls. This float incorporates an annular steel magnet. A graduated dip rod with another magnet at its inner end is free to slide up and down inside the tube.

When a reading is to be taken, the dip rod is lifted until it is held in position by the force of attraction between the two magnets. The level in the tank is then read off from the markings on the rod, and the rod pushed back into the tube and locked. The indicators are available in various materials and in lengths up to 12ft. **Alan Cobham Engineering Ltd., Blandford, Dorset.**

Reader service reference No. 148

Ice warning device

An almost instantaneous warning when the outside temperature drops to freezing point is given to drivers of vehicles fitted with the Icelert device. The object of the system is to indicate the probable presence of ice on the roads so that drivers can avoid sudden changes of speed or direction.

The electronic temperature sensing probe is fully transistorised and is of about the size and shape of a fog lamp. It must be fitted to the front of the vehicle not more than 15in. above the road. Signals from the probe operate a warning light on the dashboard which flashes as the temperature falls.

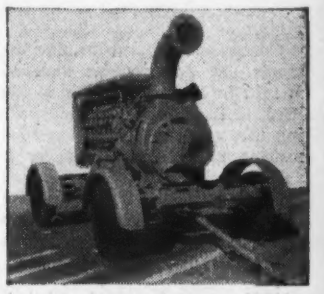
Duration of the flashes increases as the temperature decreases until eventually the light stays on continuously, indicating that the presence of ice is highly probable. The complete equipment weighs only 1lb. and it would be relatively simple to arrange for the indicator to give its warning signal at temperatures other than the freezing point of water if required. **Findlay, Irvine Ltd., Bog Road, Penicuik, near Edinburgh.**

Reader service reference No. 149

Heavy duty pump

Latest addition to the Goodenough range is the model 8D8 self-priming centrifugal pump with a maximum rated output of 138,000 gal./hr. and a maximum total head of 130ft. It can handle water containing 25 per cent of solids in suspension and will cope with stone of 1½in. diameter, mud, sand, and sludge at suction lifts of up to 25ft.

The main priming tank is of aluminium and incorporates a cast semi-steel volute which can be replaced in the event of wear. The impeller is also of semi-steel while the impeller shaft is made from a high tensile nickel steel and runs in heavy duty and roller bearings. The shaft seal is a carbon faced spring loaded unit which runs immersed in oil. Various alternative materials can be specified for the main pump parts, allowing, for example, the pumping of sea water.



HEAVY DUTY PUMP
Choice of engines

A prime mover developing upwards of 90 b.h.p. is required and the pump can be supplied coupled to a variety of air or water-cooled petrol or diesel engines or to electric motors of various types. The complete set can be mounted on a trailer, trolley, skids, or welded steel bed plates. **Goodenough Pumps Ltd., 112 Jermyn Street, London, S.W.1.**

Reader service reference No. 150

NEW Materials

Cold-sealing paper speeds packaging

A COLD-SEALING paper which can have anti-corrosion and other inhibitors incorporated in the cohesive coating is now available. The material is known as Spi-Seal, and it is already being used in conjunction with a new rotary cold-seal packaging machine — the Roto-wrap 500—by Girling Ltd., to wrap service parts. It is anticipated that the packaging of these parts will be speeded up considerably.

The machine can pack up to a maximum length of 20in. in width from 2in. up to 4in. and running rate is 300 to 800 in./min. For this application the material is based on a bleached kraft paper. **Spicers Ltd., 19 New Bridge Street, London, E.C.4.**

Reader service reference No. 151

High speed steel

An improved high speed steel containing 5 per cent vanadium and cobalt—Speedicut Vanleda—is intended for those machining applications where carbide tips are unsuitable because of lack of rigidity or because the design of the tool is unfavourable. A high proportion of the vanadium is in the form of vanadium carbide which gives good abrasion resistance with little or no loss of toughness.

The tool steel can be used for turning, milling, drilling, boring and shaping, and very good results are said to have been obtained with difficult materials such as heat resisting steels and alloys, worthwhile improvements also being recorded with low alloy steels and chilled iron. It is found to give longer tool life than 18 per cent tungsten or cobolt high speed steels. **Thos. Firth & John Brown Ltd., P.O. Box 114, Sheffield, 4.**

Reader service reference No. 152

Adhesive for metals

This flexible solvent-free adhesive for use with steel or aluminium provides a possible alternative to spot-welding for certain types of assembly. It is a heat-gelling compound designed for metal bonding where the assembly will subsequently be heat-treated, and cures to a tough, rubber-like consistency. It is not affected by oil contamination and will not flow, either in the cold state or during cure. Minimum curing time is 30 minutes at 270° F., although the bond is not impaired if this figure is exceeded.

The compound is non-inflammable and non-drying, and the curing cycle is planned to fit in with stove enamelling operations. In addition to car components, filing cabinets, aluminium doors, domestic equipment and any sheet-metal structure with a high, oven-baked enamel finish could be speedily assembled with this metal-to-metal adhesive. **The B.B. Chemical Co., Ltd., Ulverscroft Road, Leicester.**

Reader service reference No. 153

SOCKET SCREWS

SET SCREWS
To B.S. 2470/1954
Made from Chromium Molybdenum Alloy Steel to 100 T.T.P.S.I.

CAP SCREWS
To B.S. 2470/1954
Made from Nickel Chromium Alloy Steel, cold forged 80/90 T.T.P.S.I.

TEE BOLTS & SOCKET STUDS
Made from Chromium Molybdenum Alloy Steel 75/85 T.T.P.S.I. to fit British and American Standard Tee Slots.

Literature and Samples FREE on request.

SOCKETEX LIMITED
1077 Kingsbury Road, Erdington, Birmingham 24, England.
Telephone: CAStle Bromwich 3741.
Telegrams: "SOCKETEX" BIRMINGHAM.

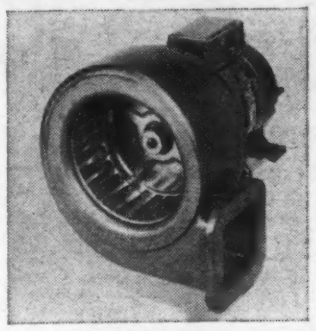
NEW Components

Blower units have sealed bearings

Three new blower units providing free air deliveries of from 80 to 260 cu.ft./min. at 2,800 r.p.m. have been introduced. They can also be supplied with 1,400 r.p.m. motors where silence of operation is a major consideration and their range of possible applications includes oil-burning equipment, ventilation, drawing office printing machines and laboratory equipment.

Shaded pole single phase motors with totally enclosed frames are normally fitted but other types, including three phase and d.c., can also be specified. Sealed, deep groove ball bearings are employed and the units can be mounted in any position. **Parvalux Electric Motors Ltd., Wallisdown Road, Bournemouth.**

Reader service reference No. 154



BLOWER UNITS
Totally enclosed motors

Castor tyres

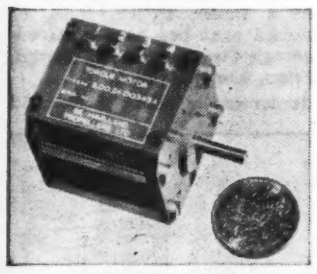
A polyurethane elastomer known as Superthane is now being used for the wheel treads of all Flexello heavy duty castors, both swivelling and stationary. It is employed for the tyres on three sizes of wheel—6 in., 8 in. and 10 in. diameter—and is claimed to offer significant advantages over natural rubber as a tyre material.

Compared with rubber, for example, the polyurethane material is said to support four times the load, to have ten times the working life, and to offer less tractive resistance. It also has good damping properties, is unaffected by oils, alkalis and the majority of acids, and will not pick up chips or filings. **Flexello Castors & Wheels Ltd., Slough, Bucks.**

Reader service reference No. 155

Torque motors

These devices, commonly known as Laws Relays, are produced by de Havilland's in two basic types, series 1A and 11A, the former having approximately twice the volume and output of the latter. They are both available in standard and low hysteresis versions



TORQUE MOTOR
Alongside a sixpence

and units with special features such as low stiffness can also be produced to customers' requirements. Applications include driving the control valves of hydraulic and pneumatic servo actuators, recording pens, and mirrors in optical simulators.

Sizes range from approximately 1.2 in. cubed up to 4 in. cubed, torque developed can be up to 2,500 gm.cm., and travel may be up to 0.35 radians. **The de Havilland Aircraft Co. Ltd., Hatfield, Herts.**

Reader service reference No. 156

R.F. heating valve

The use of an all-ceramic envelope for the 3RC/223E valve allows it to operate at much higher frequencies than similar valves having glass envelopes. It is a power triode and is intended for industrial radio frequency heating applications.

The valve is a near equivalent of the established 3J-Q-R-Z/22E family of valves which operate from a 6,000-volt supply and develop up to 24 kilowatts of output power but, whereas the anode voltage of the glass versions must be lowered for operation at frequencies above 50 M/cs., the ceramic valve can be operated at full rated voltage up to 100 Mc/s.

Other improvements include a shorter coaxial stem making for ease of cavity mounting and an improved cathode with a greater reserve of emission. The valve is available in air-cooled, vapour-cooled and water-cooled versions. **Standard Telephones & Cables Ltd., Connaught House, Aldwych, London, W.C.2.**

Reader service reference No. 157

Temperature sensors

A range of temperature sensors using pure platinum resistance wire in a strain-free condition has been developed for applications requiring highly accurate temperature measurement. Sensors of this type are said to be an improvement on thermocouples as they give a larger change in e.m.f. for a given change in temperature. Three main types are available: a surface mounting sensor, an immersion sensor, and a surface type with a very fast response.

The surface temperature sensors are available in a range of temperature bands, a typical unit covering −100°C. to +300°C., and temperatures as high as 750°C. can be measured. Shields to prevent radiation errors can be provided, and the sensors are sealed against the entry of water. They can be soldered, bolted or riveted to flat or curved surfaces.

The immersion type sensors have threaded end fittings to allow them to be mounted through the walls of tanks or pressure vessels and they will withstand working pressures of up to 3,000 lb./sq.in. The diameter of the units can be as small as 0.08 in., and they can be subjected to extreme thermal shocks with little loss of measuring accuracy. Basic resistance of both the above types is 130 ohms.

Type E100A, the fast response sensor, is suitable for heating rates as high as 3°C. a second in the range −100°C. to +250°C. (or up to 600°C. if necessary). At 0°C. its resistance is 100 ohms, and with a typical current of 2.5 milliamps it produces an open circuit e.m.f. change of the order of 100 millivolts for each rise or fall of 1°C. Speed of response to a unit change in temperature is less than 0.35 seconds. **Research & Engineering Controls Ltd., South Bersted Industrial Estate, Bognor Regis, Sussex.**

Reader service reference No. 158

Oil burner

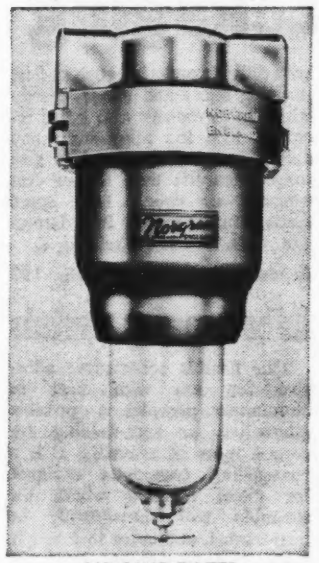
With an output of from 60,000 to 170,000 B.Th.U./hr., the Pillinger model 602 automatic burner has been designed particularly for the conversion of boilers from solid fuel to oil burning. It is held in position on the boiler front plate by only two studs and inspection and cleaning of the nozzle and spark electrodes can be carried out without breaking the oil or electrical connections.

The ignition transformer is enclosed in a sealed, pressed steel case mounted on the cast aluminium burner casing. The fuel pump incorporates a cut-off valve and is driven by a totally enclosed motor. **G. C. Pillinger & Co. Ltd., 602 Purley Way, Croydon, Surrey.**

Reader service reference No. 159

Air line filter

Latest addition to the Norgren range of compressed air filters is the type 30BE, for ¾in. and 1in. pipes. A hinged clamping ring facilitates the removal of the element and bowl. Either a transparent or metal bowl may be specified, the metal type being suitable for pressures up to 250 lb./sq.in. There is a choice of



AIR LINE FILTER
Quick acting clamp

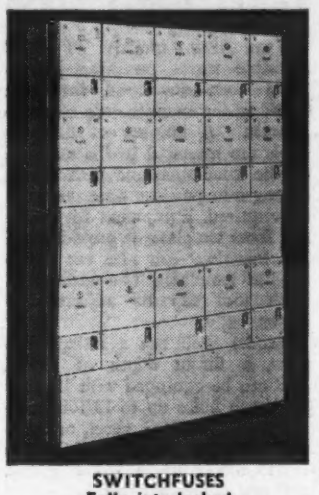
five different filter elements of either Monel or sintered bronze. Overall height of the filter is 12¼in. Similar units with automatic draining devices can also be supplied. **The Shipston Engineering Co. Ltd., Shipston-on-Stour, Warwicks.**

Reader service reference No. 160

Switchfuses

Smooth, projection-free cases allow Sandacee a.c. switchfuse units to be built up into any form of assembly without spacing. Single pole, double pole, triple pole, or triple pole and neutral facilities can be provided, with ratings of 20, 30, 60 or 100 amps, 440 volts a.c.

Detachable end plates with knock-outs are supplied as standard, but blank plates suitable for sealing chambers and glands are also available. Front operated switches with on-off indication are fitted and opening the fuse cover automatically switches to the off position. Fuse units are of the



SWITCHFUSES
Fully interlocked

Sandaspeed Duplex type having interchangeable, rewireable, or H.R.C. carriers. **Wm. Sanders & Co. (Wednesbury) Ltd., Falcon Electrical Works, Wednesbury, Staffs.**

Reader service reference No. 161

Control valve

A solenoid-operated control valve for hydraulic and pneumatic servo duties — Ether Ltd.'s type VPH—is designed for the pressure range 250 to 3,000 lb./sq.in. Orifice diameter is ¼in., the solenoid operating a pilot valve controlling a diaphragm which opens or closes the main valve. Brass or stainless steel units are available, with solenoid operating voltages of 12-440 volts a.c. or 12-250 volts d.c. **Ether Ltd., Caxton Way, Stevenage, Herts.**

Reader service reference No. 162

Air filters

A range of filters for air conditioning and ventilating systems capable of removing sub-micron particles from an air stream has recently gone into production. There are three grades available with sodium chloride penetration ratings of 0.001 per cent, 0.01 per cent and 0.5 per cent. The most efficient of the three, the 0.001 per cent penetration filter, gives a pressure drop of only 0.5in. water gauge and is capable of removing all radioactive particles and virus and bacteria down to the smallest known virus. Biological tests using bacteria and virus-size particles show that a filter with a sodium chloride penetration of less than 0.003 per cent can be regarded as 100 per cent efficient for the removal of all biological particles and is therefore capable of producing sterile air. **E. N. Mackley & Co., Hawks Road, Gateshead, 8.**

Reader service reference No. 163

Sealed transformers

A range of dust-excluding enclosures are now available for all Phillips variable transformers except the 20 amp. model. The main advantage of the enclosures is that the transformers can now be installed in situations where the atmosphere contains abrasive or corrosive dust. No derating is necessary when the enclosures are fitted providing that the ambient temperature does not exceed 25°C. The covers are of welded sheet steel construction with a hammer grey stove enamel finish and provision can be made for fitting a single pole plunger switch to isolate the transformer when the enclosure is removed. **Research & Control Instruments Ltd., 207 King's Cross Road, London, W.C.1.**

Reader service reference No. 164

NEW Publications

An illustrated booklet from I.C.I. deals with the various types of Terylene reinforced industrial hose now available. Terylene has the same strength wet or dry, has a low absorbency, and is resistant to heat, abrasion, mildew or bacteria, and most chemicals. Hoses made with this material are now available for such diverse applications as water cooling, fire fighting, carrying liquid gases, oil, compressed air, and warm air for aircraft heating.

Reader service reference No. 165

A leaflet is available on the Magnafloat permanent magnet device for separating stacked steel sheets made by Rapid Magnetic Ltd. The sheet float is applicable wherever stacked steel sheets, dry or oily, require separation to facilitate handling by press or other machine tool operators. A magnetic field is induced in the sheets so that they repel each other and fan out, leaving room for the hands to be inserted between the upper sheets in the stack. A wide variety of sheet sizes and shapes may be handled up to approximately 8 gauge, and separation may be in either the horizontal or vertical planes.

Reader service reference No. 166

A leaflet called **Rubber and Industry** has been prepared by Tempered Rubber Components Ltd. to illustrate the wide variety of mechanical rubber components such as engine mountings, anti-vibration pads, seals and bushes which this firm produces in both natural and synthetic-based rubbers.

Reader service reference No. 167

A new series of data sheets has been issued by Johnson, Matthey & Co. Ltd., covering their range of high purity metals. Information is given on 38 metals including noble, rare earth, and certain base and rarer metals. The general properties of each element are tabulated and details are given of the forms of current production. In most cases the metals are available in more than one grade.

Reader service reference No. 168

An automatic tension control system for any kind of moving web, including extensible plastics, applicable to machines with hydraulic drive is described in a leaflet from Hydraulic Machinery Drives Ltd. The system is based on a hydraulic sensing device that can detect changes in tension of ¼oz. per inch of width and which operates a relief valve to control the hydraulic motor driving the next section of the machine after the sensing device. The equipment is capable of automatically adjusting speed to allow for the change in diameter of reel occurring in the case of rewind or wind-off.

Reader service reference No. 169

A leaflet recently published by Lees Hall & Sons Ltd. gives the dimensions and capacities of a range of heat-resisting iron crucibles for the melting of zinc, tin, lead and other soft metals.

Reader service reference No. 170

Drain cleaning and testing equipment is the subject of a leaflet recently produced by the Greeham Tool Co. Ltd. The range of equipment covered includes a wide variety of cleaning tools, stoppers, testing apparatus, and the Burtonwood manhole cover lifter, a hydraulic device with a lifting capacity of 3 tons.

Reader service reference No. 171

Details of the Mond "Quality Label" scheme for decorative nickel and chromium plating are given in **Confidence in Plating,** a brochure published by the International Nickel Company (Mond) Ltd. The object of the scheme is to establish confidence that chromium plate can be good, provided that it conforms to the British Standard, and is operated in collaboration with the British Standards Institution and the British Non-Ferrous Metals Research Association. The requirements of BS.1224: 1959 are fully discussed in the brochure.

Reader service reference No. 172

Noise cancelling microphones for use in locations where high ambient noise conditions are encountered are described in a leaflet from Lustraphone Ltd. The microphones are of the moving coil type and are designed to virtually exclude background noises. Various accessories are available including telephone headsets and transistorised preamplifiers.

Reader service reference No. 173

Water level indicators for wells and boreholes, a resistance network analogue, and an electronic sequence timer are the subjects of three leaflets produced by the Electronics Division of Bruce Peebles & Co. Ltd. The resistance network analogue is a laboratory version of a research tool used in the examination of potential field problems and can be put to use to solve problems arising in many branches of engineering. It consists of a 5 x 5 resistance matrix with four edge node sockets for extending the network to multiples of the basic unit.

Reader service reference No. 174

READER ENQUIRY SERVICE

November 2, 1961

Please circle the reference number on the item on which you would like further details. Post to Reader Service Department, Engineering News, Heywood & Co. Ltd., Drury House, Russell Street, Drury Lane, London, W.C.2.

139	140	141	142	143
144	145	146	147	148
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174				

BLOCK LETTERS THROUGHOUT

Your name .....

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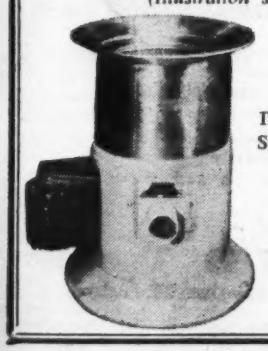
The *TWEEDY* Centrifugal Extractor

(Illustration shows motor cover removed)



Slow Speed : Maximum Extraction
Minimum Time and Effort

The Tweedy Centrifugal Extractor for Swarf — 5 sizes — robust design — Lift out basket

Full details on request to :-

GEORGE TWEEDY & CO. LTD.

CHIPPING, near Preston

Phone : Chipping 258/9

FINANCE AND COMMERCE

TRADE AGREEMENTS

CHELTENHAM VALVE FIRM FORMS BELGIUM SUBSIDIARY

CHELTENHAM manufacturers of Leonard thermostatic valves, **Walker Crosweller & Co.,** have formed a wholly owned subsidiary marketing company in Belgium. The new firm, **Walker Crosweller SA,** of Brussels, will have a Belgian general manager.

Forty per cent of the company's output is exported and there are already subsidiaries in Canada, Germany, and Switzerland.

Assembly of the Sunbeam Alpine sports car in Milan for the Italian market has been agreed between the **Rootes Group** and the coachbuilding and manufacturing company of **Carrozzeria Touring Superleggera.**

A new 300,000 sq. ft. plant incorporating an extremely modern paint shop will handle assembly of the Alpines. The first cars should be off the lines next spring.

Mutual exchange of technical information and know-how has been agreed between the **Telegraph Condenser Co.,** of North Acton, London, W.3, and the **Sprague Electric Co.,** North Adams, USA.

ENGINEERING CONTRACTS

Mills and factory for Egypt

BRITISH NORTHROP, of Blackburn, Lancashire, are to provide four cotton-spinning mills and a factory for the production of mechanical looms for Egypt.

The contracts are worth between £2 million and £2.5 million.

☆

The Electricity Trust of South Australia have ordered 4,600 yards of 66 kV corrugated seamless aluminium sheathed cables for use in the Adelaide area from British Insulated Callender's Cables.

Earlier this year BICC received a contract from the Southern Electricity Authority of Queensland for the supply of single- and three-core 33 kV CSA sheathed cables and accessories for installation near Brisbane.

☆

Contracts worth almost £250,000 have been placed with the Motor and Control Gear Division of Associated Electrical Industries.

Two are for electric drives for the steel industry.

Thirty-three motors, from 15 h.p. to 200 h.p., are for Dorman Long (Steel) Ltd., Middlesbrough, and seven are of various sizes, up to 600 h.p., with control gear, for Stewarts & Lloyds, Corby.

Ruston Bucyrus, of Lincoln, have placed orders for fourteen sets of electrical equipment for excavators.

☆

Aiton & Co., of Derby, are to supply high-pressure steam, reheat, and feed piping for Drakelow "C", the Central Electricity Generating Board's first supercritical steam-pressure station.

The design conditions for the main steam are 4015 lb./sq. in. and 1,110 deg. F., which will be conveyed in austenitic stainless-steel pipes 9 in. internal diameter, and 2.5 in. thick.

Water turbines, worth £900,000, are to be designed, built, and delivered by English Electric to the Grand River dam and power station at Markham Ferry, Oklahoma, USA.

Treasury is optimistic for exports

AN optimistic view of export prospects is taken by the current "Bulletin for Industry" prepared by the Treasury.

In the home market the Treasury's Information Division sees little sign of a rise of any substance in demand in the next few months.

A substantial increase in U.K. industrial output over the months immediately ahead depends on the vigour with which export opportunities are taken.

World trade up

"World economic conditions have improved since the beginning of the year and for some time ahead world trade should be rising," says the Bulletin.

Expansion in Western Europe and the growth of imports is expected to continue. Recovery in the U.S. from the shallow depression there has been rapid.

The Treasury's suggestion that improved credit facilities made available by the Government should help industry to take advantage of more favourable overseas conditions is borne out by the figures of increased business done under Export Credits Guarantee Departmental cover.

Fortunes vary in disturbed car market

FOUNDRY FIRM RIDES STORM

Rolls-Royce chairman sees no chance of swift recovery

HIGHLY differing experiences suffered by two firms both doing important business in the motor industry are underlined by statements from their chairmen. Major J. E. V. Jobson, chairman of Qualcast, said at his annual meeting, at Derby, that his group was in a fortunate position due to diversification.

They had not been as badly affected by the Rootes' strike as some competitors. Only one of the foundries had been put on a four-day week, and one other of the foundries was working on a six-day week.

Back to normal

So far as Qualcast are concerned, Mr. Jobson expects a return to normality when the Rootes' strike ends.

For Rolls-Royce, who report first half-year earnings increased to £59 million from the first half-year on 1960 (£51 million), there is a less satisfactory account.

The Budget restrictions on capital allowances for cars has severely restricted the demand for Rolls-Royce and Bentley models.

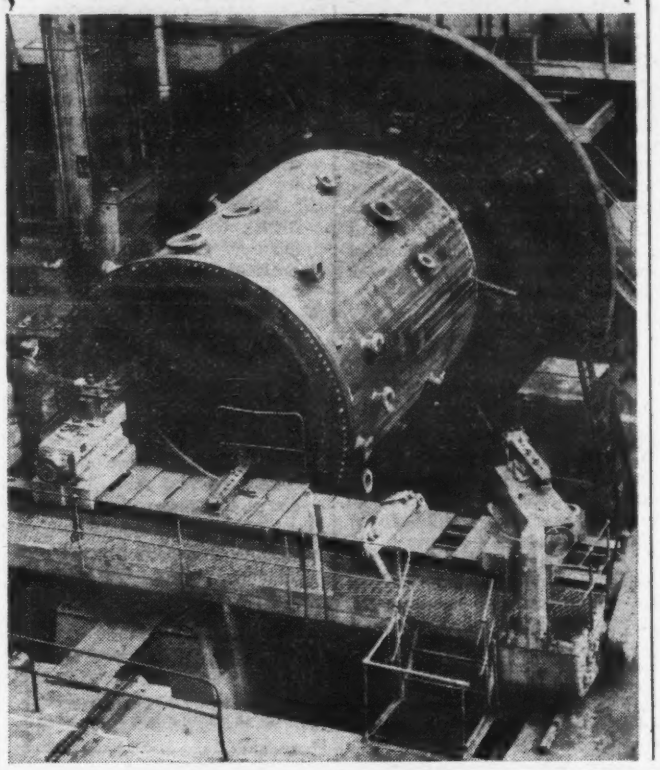
Lord Kindersley, the Rolls-Royce chairman, has said that the credit restrictions later imposed have put off the prospect of short-term recovery in demand for the company's cars.

Profits lag

Increased revenue, as shown in the half-year figures, is expected to be the pattern for the year. Research and development costs have risen ; large financing charges have been encountered, and it is predicted that results for the year are unlikely to move in step with the increased sales.

Although the proportion of total sales attributable to cars was not large last year, its contribution, after deduction of development costs, was probably larger than its share of the turnover.

Hector's pressure vessel machined



REACTOR pressure vessel for the HECTOR zero-energy research reactor of the United Kingdom Atomic Energy Authority undergoes machining operations in the heavy machine bay at the South Works, Stockton-on-Tees, of Ashmore, Benson, Pease and Company, members of the Davy-Ashmore group.

Jobs of up to 34in. diameter, 50in. length, and weighing up to 100 tons each can be machined on this face-plate centre lathe.

Principal contractor on the UKAEA for the Hector reactor is Fairey Engineering, of Heston, Middlesex.

Tap and die group report profit rise

IMPROVED trading results have been returned for the past year by all the companies of the Tap and Die Corporation. The largest exporters of screwing tools from the U.K. The combined efforts of the Tap and Die companies has lifted the group trading profits from £709,300 before tax in the previous year to £827,181 in the year up to May 31, 1961.

Turnover for the group is now running well above the level of the equivalent period twelve months ago.

The corporation chairman, Mr. D. G. N. Lloyd-Lowles, forecasts that though he cannot necessarily predict the rate of increase, profits should be higher for the current year.

Fuller exploitation of the new division added by the acquisition of the International Twist Drill Co. has been approached by the successful negotiation for the purchase of the machine toolmaking division of Smart and Brown, of Biggleswade.

EEC prospects

As long ago as 1957 the Tap and Die chairman stated that they would be able to sell as cheaply and effectively as anyone else in the Common Market, while keeping up quality.

This still holds good. If anything, the corporation is better placed to take advantage of the Common Market's opportunities for expanding trade.

The board have been looking into the raising of capital that may be necessary to fund bank overdraft and to provide for future expansion. Subject to market conditions this will now be raised by fixed interest securities, for which the company has excellent cover.

MACHINE TOOL EXPORT DELIVERIES UP BY 44 p.c.

EXPORT deliveries from the machine tool industry were 44 per cent higher last August than a year earlier. The corresponding figures, issued by the Machine Tool Trades Association (MTTA), were £2,094,000 this August and £1,462,000 in August, 1960.

The export order book for the industry at the close of the month was worth £31.8 million, against £22.5 million in August, 1960. Net new orders were valued at £3.6 million (£2.7 million).

Orders up too

MTTA figures show that over the first eight months of the year export orders were 15 per cent up on the equivalent months of last year.

Home market results are not so encouraging. Deliveries were still well up—£5.2 million this August against £5.3 million a year ago—but net new orders were worth £6.9 million, more than a million down on August, 1960, when the new orders for the month were valued at £8.1 million.

Dollars for plane firms

MORE than 40 per cent of the export sales of the aircraft industry in the first nine months of this year went to the dollar markets.

The January to September total of £118,418,000 is made up of £48.6 million from the sale of aircraft and parts, £64.2 million from aero-engines, electrical appliances, and smaller amounts from aeronautical instruments and tyres.

September's exports by the aviation firms were £9.5 million, reflecting the normal seasonal fall.

The increasing importance of aero-engine sales in the export results is shown in the breakdown of the September figures. Aero-engines and parts were valued at £6.5 million. (Canada, the US and Italy were leading customers.)

READING · SOUTHEND *and* NOTTINGHAM

NEW MODEL FACTORIES —OFFICE BLOCKS

for light industries now available, under construction or planned.

FOR SALE OR TO BE LET

S.T. Securities Ltd.,
34 Westminster Palace Gardens,
Artillery Row, London, S.W.1
Phone ABBey 6883

Opportunities for export

GREECE: Machine Tools (Local representation essential) One drilling machine, equipped with three phase motor, 220/380 and accessories. Two precision lathes, equipped with three phase motor, 220/380, and accessories. One electric welding machine.

Bids should be sent to the Director-General of Procurements, 50 Socratous St., Athens, quoting tender invitation No. B/618. ESB 32868/61. Closing date 16 November, 1961.

INDIA: Machine Tools. One shearing machine, power operated. Capacity to cut 10 g MS plate 48in. width. One rolling machine, hand operated. Capacity to roll 16 g MS plate 36 in. width.

One Press Brake, power operated. Capacity to bend 16 g MS plate 36in. width.

Materials should conform to relevant Indian Standard Specifications.

Bids should be sent to the Purchase Division, Atomic Energy Establishment, Trombay, Mohatta Building, Palton Road, Bombay 1 quoting tender No. AEE/P/CAP/5856. Closing date 24 November, 1961. ESB 33408/61.

IRAN: Sandblasting Machine. One sandblasting machine, rotating plate 1,600 mm diam., min scattering height 300 mm, for sandblasting automatic weapons, to include 380 volt, three phase 50 cycle motor.

Bids WORDED IN GERMAN should be sent to Edareh Taslihate Artech (Armament Dept. of the Imperial Iranian Army), DT/Section, Avenue Jale, Teheran. Closing date 25 November, 1961. ESB 33190/61.

PAKISTAN: Copper Rod; Cupro Nickel Alloy. 626 cwt. Copper Rod, hard rolled, for boiler stays, various diameters. 44 cwt. Cupro Nickel Alloy on the basis of 50/50 in moulds and blocks of two to four lb. each.

Bids should be sent to the Chief Controller of Purchase, Pakistan Western Railway, Empress Road, Lahore, quoting tender No. P-7/478/2/61. Closing date 15 November, 1961. ESB 33191/61.

SUDAN: Spindles for telephone line works. 120,000 GI Spindles straight, long with nut and spring washer to comply with BS Spindle No. 1 (A) and Fig. 23 of BSS 16: 1949.

Bids should be sent to the Controller of Stores and Workshops, Department of Posts and Telegraphs, Light Industrial Area, Khartoum South, quoting Contract No. 50. Closing date: 6 December, 1961. ESB 33169/61.

SUDAN: Heavy-Duty Centre Lathes. Two Heavy-Duty Centre Lathes, height of centre 8¼in., swing over saddle 14in., over bed 22in., admitting 5ft. 9in., between centres, with taper turning attachment.

One Heavy-Duty Centre Lathe, height of centre 19in., swing over ways 38in., swing over spindle 28in., admitting 12ft. between centres, with 4-ways steel turret, chucks, etc.

Bids should be sent to the Assistant General Manager (Supplies), the Sudan Gezira Board, Barakat. Closing date 2 December, 1961.

Inquiries should go to the Export Services Branch, Board Trade, Lacon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

FINANCE AND COMMERCE

ABERFORTH MAKES BIG BID

Reconstruction of company is now in final phase

RECONSTRUCTION of the Aberforth Holdings company, formerly the Aberforth Property Investment company, as a group of engineering and allied firms is now in its final phase and includes negotiations for the total share capital of a well-known engineering concern.

These negotiations are reported by Mr. W. H. R. Barker, the Aberforth chairman, to be "approaching finality". This will be an important step in the reshaping of the group.

Profits of the subsidiaries, which include Hopper Engineering and Foundries, of Norwich, have been at the rate of £257,000 a year in the half-year to June 30, 1961, before tax.

Boardroom changes in Aberforth in March, 1960, brought major policy changes and the decision was taken to sell the property interests and concentrate on building up an industrial group.

Borrowing cut

The chairman's statement for the 18 months up to last December refers to the high interest charges incurred on the large amounts borrowed in purchasing the shares of British Benzol and Coal Distillation Ltd. and J. S. Darwen and Company, together with the overdraft from the earlier purchase of the property investments.

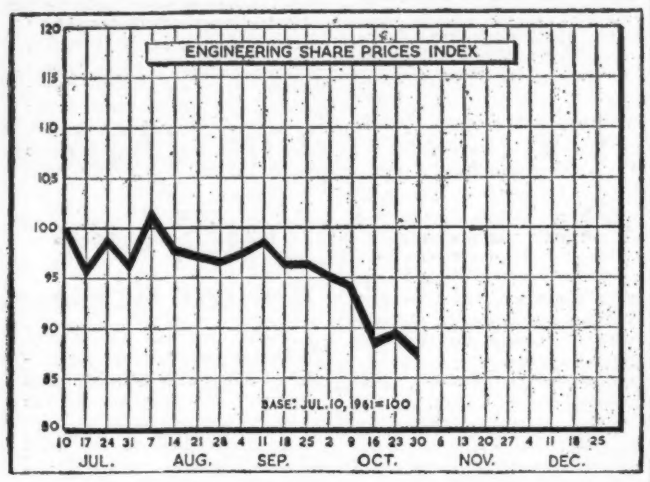
These borrowings are now substantially reduced.

Hopper Engineering and Foundry has returned satisfactory results, and is to be the subject of a redevelopment scheme increasing capacity and improving efficiency.

Interim dividends amounting to 12½ per cent have already been paid but the board have not been able to put into effect their intention of paying a final dividend for the 18 months being reviewed.

"Until the outcome of the board's planning has progressed further it is not proposed to forecast a dividend payment, although if matters turn out as expected, it is hoped that not less than 15 per cent will be payable in a full year, without taking into account further acquisitions."

Group profits before tax, over the 18-month period, were £112,988. The chairman's figures for the results of the subsidiaries in the half-year up to the end of June, 1961, suggests an improved position when the results for the current year are declared.



IRON, STEEL BAN EASED

SURPLUS capacity in the steel industry, where only 77 per cent of potential was operating at the last count has led to an easing of the prohibition of iron and steel scrap exports.

An open general licence is being issued with the effect from the end of this month until February 28, 1962. Shipments of compressed baled iron and steel scrap and iron and steel scrap turnings and borings are covered by the licence, but in each case shipments must not be of greater value than £25 (f.o.b.).

Tough talk from Sir K. Joseph

TAX relief for exporters has been turned down flat by the government.

Sir Keith Joseph, Minister of State at the Board of Trade, has pointed out that by agreement with ourselves, other countries, particularly Germany, who did give such incentives to exporters, have abandoned the practice.

For Britain to embark on the tax relief proposal would be to break international agreements and to start on a course, "from which we might lose more than we could ever hope to gain".

Sir Keith was speaking to the British Chemical Plant Manufacturers' Association. He emphasised that there is no permanent shelter at home. He said:

If you can't sell your product aboard you soon will not be able to sell it at home either — for two reasons.

First, because if we don't as a nation export enough the government will have to reduce, not just steady, home demand.

Secondly, because as tariffs come down — as they will do whether we go into Europe or not — overseas producers will beat the non-competitive firm on its home ground.

NEW Companies

DKW Engineering Services Ltd., Barclays Bank Chambers, Market Place, Redditch. To carry on the business of manufacturers and dealers in machine tools. Nominal capital £1,000.

Independent Consultancy Services Ltd. To carry on the business of industrial, organisation and consulting engineers. Nominal capital £100. Subs: S. M. A. Barnes, 20 School Close, Holmer Green, Bucks. P. N. Coleman, 23 Northall Road, Barnehurst, Kent.

Instral Ltd., 51 Wardwick, Derby. To carry on the business of specialists, designers, manufacturers of and dealers in electronic equipment. Nominal capital £3,000.

Idra Ltd., 52/53 Jermyn Street, London, S.W.1. To carry on the business of importers, exporters and distributors, manufacturers of and dealers in hydraulic and other presses and other plant or machinery. Nominal capital £5,000.

Liquified Pressure Gases Ancillary Services Ltd., Subs: R. W. Murrell, 37 Gilmore Crescent, Ashford, Middx. D. H. Nicholls, Roman House, Wood Street, London, E.C.2. Nominal capital £100.

Reconditioned Units Ltd., Whitefield Road, Bristol 5. To carry on the business of designers, provers, manufacturers of and dealers in pumps, combustion engines. Nominal capital £1,200.

Shipton Automation (Rentals) Ltd. To carry on the business of letters on hire of electronic and electrical apparatus. Subs: Stella Allen and Ellen Tindall, Barrington House, 59/67 Gresham Street, London, E.C.2. Nominal capital £100.

Sondec Ltd. To carry on business of electronic, electrical and civil engineers. Directors: A. V. Lorenshaw, 1 Little Dover House, Dover Park Drive, London, S.W.15. F. E. S. Robinson, 65 Reigate Road, West Worthing, Sussex.

Wilson and Jeffs Ltd., 13 Eaton Road, Coventry, Warwickshire. To carry on the business of heating and ventilating engineers. Nominal capital £100.

Town & Country Heating Ltd., 478 Fulham Road, S.W.16, to take over the business of heating and ventilating engineers carried on as "Thermheat". Directors: T. Q. Battle, 620 Nevern Square, S.W.5, and R. G. Lloyd, Ashmere Cottage, Soley Road, Esther, Surrey. Nominal capital £1,000.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

Whitehall clamp keeps shares activity low

WEEK IN THE CITY

BY OUR CITY EDITOR

ALTHOUGH gilt-edged stocks have been attracting support in hopes of a further reduction in Bank Rate, industrial share markets have remained dull and listless. Engineering issues have shared in the general malaise.

The Berlin situation and Mr. Selwyn Lloyd's promise to introduce legislation for taxing short-term capital gains have helped to dampen sentiment, but the main influence is the uncertain outlook.

Bank advances have shown a further contraction and there has been a more than seasonal rise in unemployment.

Despite the troubles of shipbuilding and other industries, industrial activity remains generally high, but the forward thrust in exports which the present situation requires has yet to show in the official trade figures.

Some sectors of manufacturing industry — machine tools for example—are known to be doing well on the export side, but the Chancellor has again made it clear that he does not think it would be wise to relax economic policies.

With sterling at a high level against the dollar and money still flowing into London from abroad, the chances that the authorities will concede "the other half" and cut Bank Rate from 6½ to 6 per cent must be considered good. But if the Chancellor means to persevere with his wage pause policy the scope for other concessions is strictly limited.

Engineering company news continues to reflect the present difficulty in maintaining profit levels. Total revenue of Rolls-Royce in the first half of this year, at £59 million, was £8 million up on the corresponding period of 1960, but the directors state that results for the full year are unlikely to show the expected improvement.

Reduced home demand for Rolls-Royce cars and increases in aero research and other costs are blamed. At the end of last week the company's £1 shares were priced around 39s. 9d., against 48s. 6d. earlier this year and show a dividend yield of about 5½ per cent—a relatively high return for this "blue chip" equity.

Stone-Platt Industries slumped by several shillings on the announcement of a cut from 4½ to 4 per cent in the interim dividend, but picked up a little on a mildly reassuring statement about trading.

For 1960 Stone-Platt made a total payment of 16 per cent. The fact that the directors have "considered it prudent" to revert to the former practice of paying a 4 per cent interim suggests that a maintained 16 per cent total is the best that shareholders can hope for in respect of 1961. For 1960, the dividend was about 1.6 times covered.

Reed Crane take over Peckett's of Bristol

THREE times since starting to manufacture 16 years ago "we have burst at the seams and now we are bursting again."

This is the explanation given by Mr. E. P. Young, managing director of Reed Crane and Hoist, of Fishponds, Bristol, of their acquisition of Peckett and Sons, one of the oldest established (1863) engineering firms in Bristol.

Peckett's have been well known throughout the world for the manufacture of steam locomotives at Atlas Works, St. George, Bristol.

Diesel effect

The widespread introduction of diesel engines on the world's railways, docks and large plants has meant a steep fall off in orders for the steam driven engines.

About ten years ago, Peckett's attempted a come-back with the launching of a diesel incorporating a revolutionary automatic gear box.

New drawing and other offices were built to deal with the expected demand, but success did not follow—mainly due to failure of the gear-box as a commercial proposition.

Peckett's full capital has been taken over in the recent deal. Mr. Wilfred Peckett, former managing director and his cousin, Mr. Roy Peckett have both sold their share holdings and will not be on the board of the new company.

Spares continued

Mr. Young stated the name of Peckett will continue and part of the works now taken over will be occupied for some time on the production of spares in which there is still a good business.

The Reed, Crane and Hoist Co., a subsidiary of Harper Engineering and Electronics Ltd., has full order books for cranes of up to 50 tons capacity.

More than 5,000 Ford Anglia and Classic models have been flown to France by Ford of Dagenham in recent months, as part of their Common Market sales campaign.

EXPORT CREDITS BOOM

BUSINESS carried on under the insurance of the Exports Credits Guarantee Department is increasing to record heights.

The value of business declared under "commercial" insurance in the third quarter of this year was £190.5 million, a record for the quarter.

In the same quarter of last year the total had been £180.2 million. The level of business in this sector this quarter is £1.2 million above the second quarter of this year.

Specific policies issued during the quarter were for contracts worth £27.1 million.

Nuclear plant

They included £5.5 million for nuclear power plant, £8.2 million for conventional power plants, £2.3 million for vehicle assembly plant, £1.4 million for chemical plant and ship mortgage cover of £1.1 million on a cargo vessel.

One of the claims paid by ECGD during the quarter was for £314,000 caused by a default on a Middle Eastern project.

Comprehensive policies went up in number during the quarter, by 605, Their value increased over the previous year by around 20 per cent, from £699.3 million to £835.4 million.

Nine of the new comprehensive policies issued in the quarter were for individual export turnovers exceeding £1 million.

The "small exporter" policies sold since their introduction last April now number 446 and a cover of £638,000 has been allocated.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Oct. 30	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Oct. 30	Ch'ge	Y'ld p.c.
47/9	30/9	Allen, Edgar (£1)	30/9	–1/3	8.6	57/-	44/9	Lister, R.A.(£1)	51/3	+1/6	5.3
43/-	26/-	Allen, W. H. (£1)	26/6	+6d.	7.2	51/9	36/-.	Mather & Platt (£1)	36/-	...	6.0
77/-	58/6	Angus, George (£1)	67/6	...	...	67/-	46/-	Metal Industries (£1)	46/-	–1/-	6.4
31/10½	19/-	A.P.V. (10/)	29/-	–3d.	3.8	71/3	53/4½	Morgan Crucible (£1)	58/3	–6d.	4.7
14/1½	8/10½	Asquith Machine Tool (5/)	9/9	–3d.	2.5	31/-	19/6	Morris, Herbert (10/)	19/6	–9d.	8.0
48/6	29/-	Assoc. Electrical Ind. (£1)	29/9	–6d.	10.0	52/-	37/3	Murex (£1)	37/9	+6d.	6.7
16/5	11/8	Assoc. Engineering (5/)	12/4½	–1½d.	5.3	49/6	40/6	Needsend Steel (5/)	43/-	...	5.9
110/-	83/-	Averys (£1)	85/-	–1/-	3.5	31/6	21/-.	Newton Chambers (5/)	21/-	–9d.	4.6
36/9	20/-	Babcock & Wilcox (£1)	21/9	+3d.	...	41/3	21/3	Parkinson Cowan (£1)	21/3	...	8.2
59/6	40/6	Baker Perkins (£1)	43/9	–9d.	5.1	72/9	47/-	Parsons, C. A. (£1)	48/6	–1/-	5.1
9.7½	5/10½d.	Beyer Peacock (5/)	6/1½	–1½d.	9.4	40/3	38/-	Plessey (10/)	38/3	–1/9	3.9
77/-	45/-	Birfield (£1)	61/6	...	3.2	33/-	16/-	Pressed Steel (5/)	17/9	+1½d.	8.3
102/10½	68/3	Birmid Industries (£1)	68/6	–9d.	5.9	25/3	19/9	Quelcast (5/)	19/9	–6d.	4.5
36/10½	19/6	Birmingham Small Arms (10/)	19/6	...	5.9	38/1½	22/3	Radiation (£1)	22/3	–6d.	8.9
45/6	33/6	Brockhouse, James (£1)	34/-	–3d.	7.2	22/6	14/-.	Ransome & Marles (5/)	14/9	–3d.	4.6
28/9	22/2½	Broom & Wade (5/)	24/3	+3d.	4.5	28/6	22/6	Ransomes, Sims & Jeffs (£1)	22/6	–1/-	6.7
42/6	29/9	Brotherhood, Peter (10/)	29/9	–2/3	8.0	50/6	34/6	Renold Chains (£1)	38/9	–6d.	5.1
48/9	30/4½	Brown, John (£1)	30/4½	–1/7½	7.1	52/3	38/-	Reyrolle, A. (£1)	38/3	–9d.	5.0
8/6	4/6	Cammell Laird (5/)	4/6	–3d.	...	9/1½	4/-	Richardsons Westgarth (10/)	4/-	–4½d.	...
39/6	29/3	Carrier Engineering (5/)	31/3	...	3.9	9/3	4/9	Roberts, Charles (5/)	4/9	–1½d.	...
54/3	36/6	Clarke Chapman (£1)	40/-	–3d.	6.7	48/6	39/9	Rolls-Royce (£1)	39/9	–9d.	5.5
14/9	9/6	Cohen, George (5/)	9/6	–3d.	6.5	32/6	20/-	Ruston & Hornsby (£1)	20/-	...	8.7
33/10½	21/8	Coventry Gauge & Tool (10/)	28/6	–1/1½	4.2	19/3	14/-	Serck (5/)	14/-	–3d.	4.4
12/3	7/3	Craven Brothers (5/)	8/-	+9d.	5.2	23/9	12/7½	Shaw, Francis (4/)	13/1½	–9d.	5.9
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27/7½	19/9	Delta Metal (5/)	20/-	...	4.9	23/9	13/9	Smith, S. & Sons (4/)	13/9	...	5.9
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40/6	26/3	English Electric (£1)	27/6	–1/3	7.2	17/4½	12/6	Thompson, John (5/)	12/6	–6d.	2.0
37/3	23/-	Firth Cleveland (4/)	23/-	–2/4½	5.6	7/-	4/9	Thornycroft, John (4/)	5/4½	+4½d.	7.0
39/6	24/3	G.E.C. (£1)	25/-	–3d.	8.1	17/6	11/6	Toledo Woodhead (4/)	14/7½	...	5.3
65/-	42/9	General Refractories (10/)	48/9	–9d.	5.0	85/6	55/-.	Tube Investments (£1)	58/6	+6d.	4.7
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108/7½	76/-	Guest, Keen & Nettlefold (£1)	76/-	–4/3	4.2	157/6	122/6	Walmsley (Bury) (£1)	132/6	–2/6	3.4
48/7½	26/6	Haden, G. N. (5/)	27/-	...	3.6	84/6	64/6	Ward, Thos. W. (£1)	67/-	–6d.	4.1
16/6	12/1½	Hall-Thermotank (5/)	12/4½	+3d.	4.4	17/9	12/3	Weir, G & J. (5/)	12/7½	...	7.0
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33/3	26/6	Hawker Siddeley (£1)	26/6	–10½d.	7.8	14/1½	10/1½	West, Allen (5/-)	10/1½	–1½d.	6.5
31/-	19/9	Head Wrightson (5/)	19/9	–1/-	3.9	46/3	24/9	Westinghouse Brake (£1)	24/9	–9d.	8.8
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95/6	75/-	Hick Hargreaves (£1)	71/3	–3/9	5.7	17/-	12/-	Wilmot-Breeden (5/)	13/10½	+7½d.	4.0
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25/-	18/6	Howden, James (5/)	20/-	–1/-	6.1	64/9	44/6	Worthington-Simpson (10/)	48/-	–1/-	5.1
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43/7½	25/4½	Dorman Long (£1)	25/4½	–2/3	7.7	68/7½	42/1½	John Summers (£1)	42/4½	–6d.	7.0
55/1½	37/6	Firth & Brown (£1)	37/6	–7½d.	6.6	55/7½	38/-	United Steel Cos. (£1)	40/3	–7½d.	6.1
49/10½	31/1½	Lancashire Steel (£1)	31/6	–4½d.	6.9	63/6	46/-	Whitehead Iron & Steel (£1)	46/-	...	6.4

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

VIBRATION-CONTROLLED FOUNDATIONS

FROM FIVE YEARS RESEARCH CAME THE BASIC THEORY

by

ROLT HAMMOND

A.C.G.I., A.M.I.C.E.

ANYONE who wishes to build a factory nowadays cannot build it just where it is most convenient for him and his firm.

He has to obtain planning permission from government departments, from local authorities, and from many other people before he can go ahead with the scheme.

This may mean that a firm of drop stampers, for example, are obliged to found their machines on a marsh, or in a thickly built-up area. In the latter case, neither noise nor vibration can be tolerated and the foundations will have to provide complete vibration control over the whole working range of the machines.

In the early days of the second world war the Ministry of Aircraft Production became extremely disturbed about the exceptionally large number of forging hammer foundation failures, as well as about the fatigue suffered by the hammers and their supporting structures.

A committee was set up to study the problem. Up to 1943 the basic theory of machine foundations was completely unknown, in spite of much research all over the world into the vibration conditions of soil, the fatigue strength of concrete, vibrational mechanics, and other related subjects.

Outstanding research was undertaken by J. H. A. Crockett over a period of five years on forging hammers under working conditions.

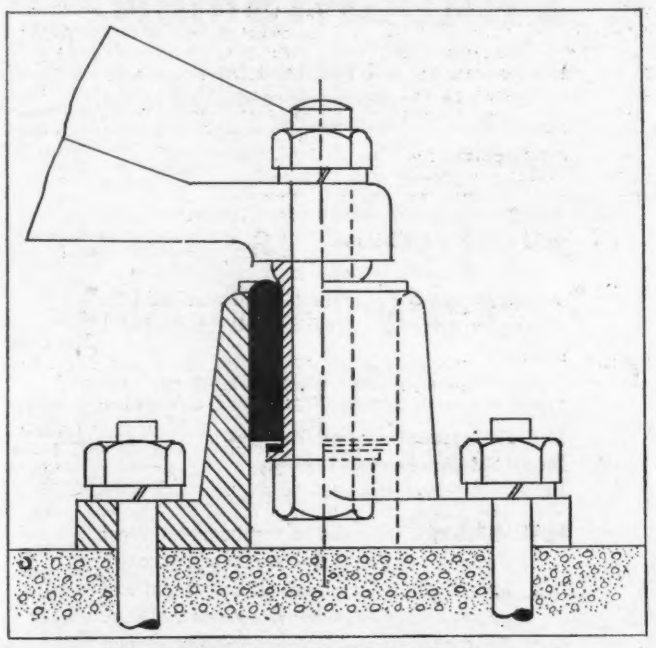

Fig. 2. Pedestal type mounting for vibration control.

Basic principles

Using the best available techniques, and aided by a strong team of mathematicians, physicists and engineers, he established the basic principles.

The most important benefit derived from this work was that the terms of reference instructed the engineers to apply their results at once to practical problems.

Indeed, so sparse was information on this subject in 1943, that not a single series of correct formulae existed which could be applied to the design of hammer foundations.

Since the early days of pioneer James Nasmyth and his French colleagues, the modern type of forging hammers had been developed entirely by empirical methods.

As a result of the 1943 work, the André Rubber Company was asked to develop a wide range of rubber resilient pads and spring mountings suitable for all sizes of hammers, and Messrs. Lockheed developed some remarkable shock-resisting oil dampers to control heavy vibrations.

It is important to draw attention to recent county, borough, and city Acts in which it is often stated that industrialists and factory owners must take all reasonable precautions to prevent a nuisance arising from noise and vibration.

If the local authorities are not satisfied that reasonable steps are being taken they can have an injunction issued to stop the plant.

The Public Health Act of 1936 states that if the same trouble affects the health of people living or working nearby, all practical steps must be taken to stop it.

The 1947 Town Planning Act declares war on "noise and vibration" as well as on smoke, fumes, smells, and dust.

Yet it is impossible to please everyone, as I discovered when I visited a forge in Coventry where a large sum of money had been spent on a vibration-controlled foundation for a forging hammer.

The works engineer told me that after the foundation had been finished and the hammer was working without transmitting any vibration to the adjacent ground, a man who lived near the forge wrote a letter to the management complaining that he could not sleep because the noise and vibration no longer existed!

Crockett applied his knowledge and experience to good effect when he designed and supervised the construction of a revolutionary vibration-controlled hammer foundation for the International Nickel Company of Huntington, U.S.A.

8-ton tup

This forging hammer has an 8-ton tup. It works on superheated steam, and is used for forging nickel and nickel-copper blooms and billets.

It is claimed that this hammer produces the maximum shock possible in modern forging practice.

This pioneer installation is the first to have been analysed for shock, vibration, movement, and loads in all directions; the first in which stressed concrete has been employed for inertia blocks; and the first to use a special type of grouted concrete for the latter with exceptionally high crushing strength.

Detailed design

Its design involved a detailed calculation of the shock load imparted to the foundation at the moment of impact, with the essential requirement that the concrete would not fail by fatigue even after millions of stress reversals had occurred under normal working conditions.

Fig. 1 shows the general arrangement of this foundation, in which the special Prepakt concrete employed for the two inertia blocks is composed of coarse crushed limestone aggregate—the voids were filled by pumping into them a special grout developed by research at the University of California.

Crushing strength

This concrete had a cube crushing strength of 15,000 lb/sq. in. after 12 months, and the steel stressing cables are loaded to about 70 tons/sq. in.

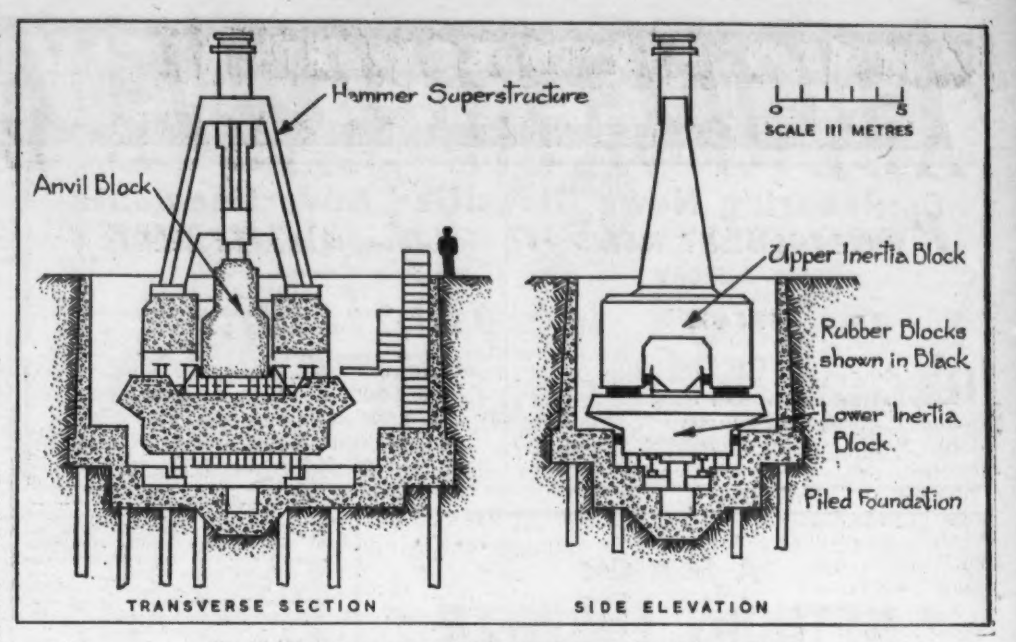

Fig. 1. General arrangement of forging hammer foundation designed by Crockett for the International Nickel Company of the U.S.

The stressing cables are arranged in the inertia blocks to provide longitudinal, transverse, and vertical loads simultaneously.

The above installation is clearly expensive.

Fig. 2 shows a type of pedestal vibration - controlled mounting, using rubber as the isolating material, and in which the outer member is a casting with a flanged base, so that the engine or machine is floating on rubber, and the efficiency of the mounting is independent of human error.

Available range

This mounting is available in a range of sizes capable of supporting loads from 0.125 cwt. to 30 cwt. on each anti-vibrator. The top of the units can be bolted to the base of the engine or machine, the base being secured to the floor or support.

Fig. 3 shows a typical arrangement of a reinforced concrete block foundation for a pneumatically operated power hammer, designed by Christie and Grey, in which the vibrations are isolated from the ground by a laminated steel spring suspension system.

The three-point suspension and isolated concrete inertia block are designed so that, in plan, the combined centre of gravity of the hammer and concrete block and the centre of support coincide with the centre of impact.

This design is claimed to result in increased and improved stability, reducing the movement of the hammer when the blow is struck.

Generally speaking, a forging hammer causes the worst structural and ground-borne vibrations. In this country some thirty forging hammer foundations were mounted on resilient pads between 1946 and 1958, and about three on steel springs; during this same period mat installations greatly increased and rubber is now widely used.

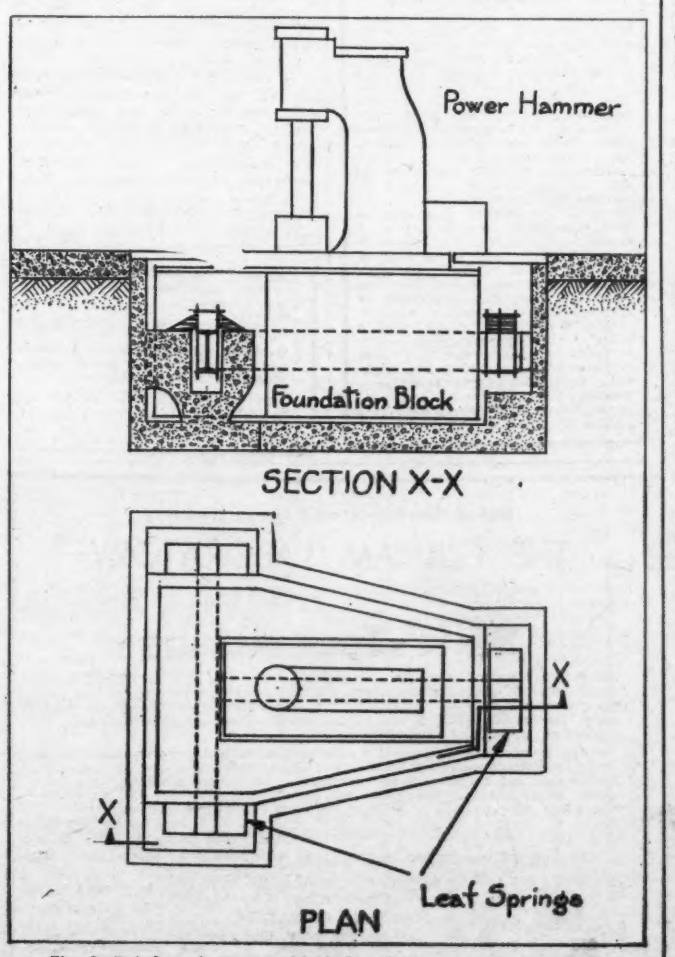

Fig. 3. Reinforced concrete block foundation on spring mounting.

ICI chairman slates 'Britain's softness'

ONE of the curses of the political atmosphere in Britain today is the sentimental softness towards inefficiency, said Mr. S. P. Chambers, chairman of Imperial Chemical Industries, in his opening address to the sixteenth national conference of the British Institute of Management at Torquay recently.

This softness, he went on, keeps uneconomic mines going long after they should be shut; makes industrialists go to places which are unsuitable because the unemployed will not move to where there is employment; subsidises or protects industry which cannot otherwise survive—all reducing the productivity of the nation as a whole.

The theme of the conference was Management in a New Industrial Revolution, and the first part of Mr. Chambers' address was concerned with changes in the country's share of world trade.

Our average rate of growth, he said, during the 1950s, as measured by the growth in national product per man-year, was low compared with that of countries such as Japan, Italy, West Germany, France, or the U.S., but we should not conclude automatically that we in this country are less efficient, or that the U.K. is on the way to becoming a backward country.

It is not a matter of great concern, for example, that Britain's share of world trade is declining, for world trade and industry would be in a parlous and unhealthy condition if the quite exceptional position of Great Britain in the nineteenth century remained unchanged.

Action urged

The countries with the highest growth rates are precisely those countries with furthest to go to catch up.

Industrialists should take all the political action they can to get the Government to do what is required for the health of the economy, said Mr. Chambers, but they must recognise that there is still much that individual businesses can do by good management to help themselves.

He stressed the importance of studying changes in the pattern of world trade and said that in his view there are certain industries where the main developments will take place outside Britain, Europe or the U.S.

Wherever wages represent a large proportion of total costs, and transport costs are low, there may be decisive advantages in manufacture in countries where wages are low.

Effective forecasting of changes in trade calls for reliable information on technical, economic and political trends, and Mr. Chambers appealed to managements to co-operate with fact-finding bodies such as the Board of Trade and the Federation of British Industries.

Information vital

However tiresome requests for information may seem at the time, they are the bases on which a flow of digested economic information can be provided—information which may be very relevant to policy decisions to be made by the firms supplying the facts.

A later speaker at the conference, Mr. Frank Nixon, of Rolls-Royce, was critical of industry's attitude to the importance of quality of workmanship.

"It is symptomatic of current British lethargy that nowhere else is progress in the adoption of quality control making such slow headway. The countries of the Common Market have all accepted the concept," he said.

Mr. L. Landon Goodman, of the British Electrical Development Association, presented a paper on Management and Automation.

He gave interesting examples of what is known as low cost automation — the elimination of manual operations using simple pneumatic, electric, hydraulic, and mechanical components.

A characteristic feature of this type of production development is that the same components, e.g., air cylinders, solenoids, timers and valves, can be used again on different jobs.

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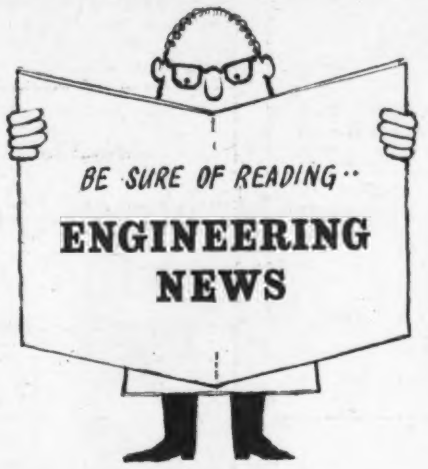

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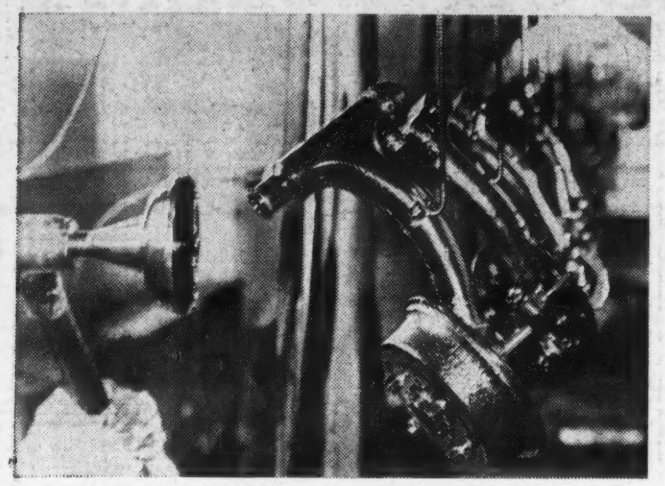
BMC COMPLETE £800,000 EXTENSION



Electrostatic paint sprayer — revolving electrified bells throw atomised paint off the rims.

Phase one of £49m. plan will boost annual parts output by 25p.c.

ONE of the first important factories in the British Motor Corporation's £49 million expansion plans was opened to visitors yesterday. This £800,000 extension to the tractor and transmissions branch at Birmingham covers 190,000 sq. ft.

It will increase axle and front suspension unit production by 25 per cent.

This, in turn, will make a major contribution to achieving BMC's million - vehicles - a - year aim. Present productive capacity is 750,000 a year.

All axle and allied unit work can now be carried out under one roof, and about 130,000 square feet of factory floor space at the T and T factory is released to the adjoining body-building works of Nuffield Metal Products.

Three assembly lines

NMP is to lay down three assembly lines in this space for Austin Seven and Morris Mini-Minor bodies.

BMC say that by the extension they have succeeded in getting a far greater productivity per unit of productive area.

MORE SPACE RELEASED FOR 'COMPACTS'

The block itself contains about 360 machine tools "of the most modern type", five assembly tracks for the conventional - type rear axle and three tracks for independent rear suspension.

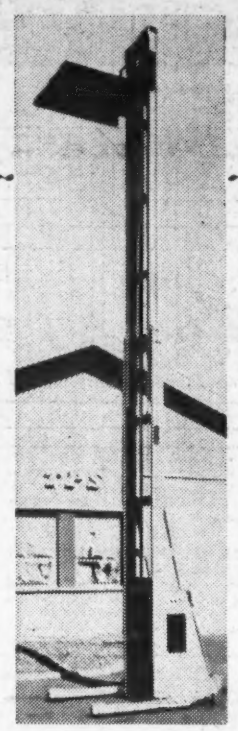
In addition, an electrostatic painting process to paint the assembled units had been adopted. It is the No. 2 Ransburg Paint Plant. It uses only 353 gallons of paint per week compared with the 830 gallons used with the previous method.

Less wastage

The positively charged paint is attracted to the metal surface of the components, reducing the paint wastage through overspray.

The paint is piped from a central mixing vat to all four booths, and is circulating at all times — including holidays — to keep it at the right consistency.

Modern heat treatment plant has also been incorporated embodying, in addition to controlled temperature, automatic quenching and continuous gas carburising.



30ft-REACH TRUCK FOR TRINIDAD

PICTURED above is Trucks and Pallets (Scotland) warehouse stacking truck. It stretches up 26 feet and has been shipped to Trinidad for The Trinidad Distillers Co.

This range of trucks, developed to suit the whiskey industry in Scotland, has now been widely accepted for the modern racked type of warehouse.

It has a reach of 30 ft. and a lifting speed capable of handling 350/400 barrels per day.

The majority of these trucks are fitted with flameproof electrical motors and control gear to suit mains electric supply but are also available with battery power units.

TOP ATOM PLANNERS SHOULD COPY BRITISH PIONEERS

AN expert in marine engineering, lecturing at the N.E. Coast Institution of Engineers and Shipbuilders this week, urged those engaged in developing nuclear propulsion to emulate British pioneers who led the world in marine propulsion.

Giving the thirteenth Andrew Laing Memorial Lecture at the Institution, Dr. A. W. Davis recalled engineering highlights that symbolised Andrew Laing's career, and drew attention to rapid developments that took place in his time.

Following a brief review of the ups and downs of marine engineering in this country through two wars, he said that some research associations formed towards the end of the Second World War have been successful.

No suitable reactor

Of these, the Pametrada turbine testing station, the Admiralty-Vickers Gearing Research Association, and the Yarrow-Admiralty Research Department for design of naval machinery were the most noteworthy.

Although recognising that it is easy to criticise research, he said the British Shipbuilding Research Association and the U.K. Atomic Energy Authority took steps in 1955 to form a liaison for developing nuclear propulsion.

However, he said no attempt had been made to find a reactor suitable for marine application.

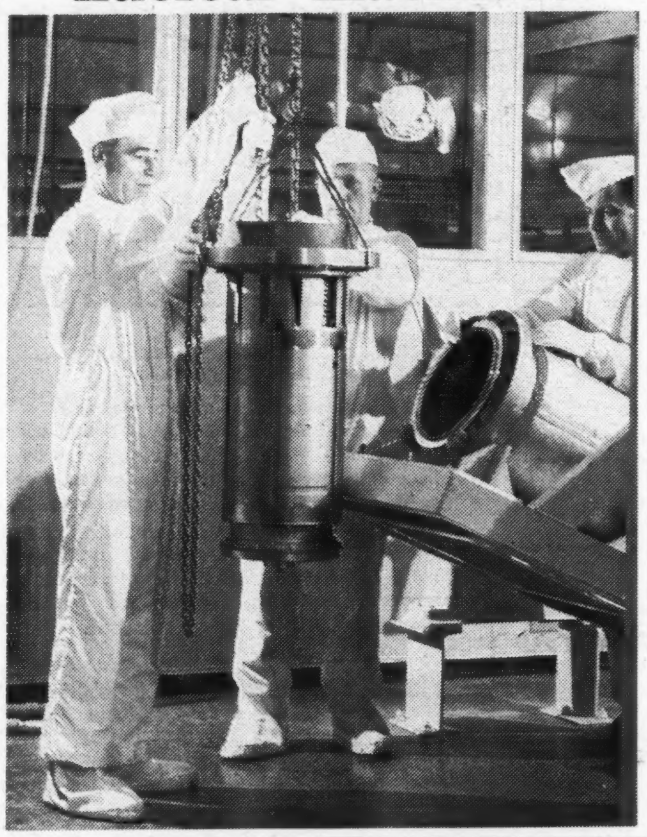
He said it would be almost twenty years before a British-built merchant ship could be sent to sea powered by a British-designed reactor.

Understanding is needed

More time is lost in industry through mental illness than through trade disputes. Pointing this out at a Harrogate conference last week, Sir Kenneth Parkinson, a Yorkshire industrial leader, said that between a third and a quarter of all absence from work on medical grounds was due to mental illness.

Dr. J. A. L. Vaughan-Jones, a Ministry of Labour area medical adviser, said that there was still room for improved attitudes of the working population to recovered mental patients.

Keeping it clean for nuclear machines



GAS Bearing circulators, mainly used in the nuclear industry where it is necessary to keep gas free from contamination, have been developed by Bristol Siddely Engines over the past five years.

They require high precision engineering, special tools and inspection equipment, and a "clean room" technique (pictured above).

Transit from a semi-clean to a clean area has to be made through a transfer lock.

This is humidity and temperature controlled.

New factory for Hydra

A NEW factory for the production of Hydra rotary oil burners has been completed at Teams, Gateshead, by the Redheugh Iron and Steel Company for Redheugh Hydra.

Production is now steadily increasing. Allowance for further expansion has been made, and service contract work will be carried on from the Staines headquarters.

A substantial part of the output of Hydra burners go overseas for diverse functions, from tea drying in Pakistan, India and Ceylon to oil-fired varnish kitchens in Mexico.

The burner has been widely applied for more than thirty years in industry and is best known for firing industrial steam and hot water boilers using the cheapest and heaviest grades of fuel oil.

SPEND Q3 MONEY ON AIRCRAFT—WORKERS

WHAT has been described as a "propaganda" or "friendly token" stoppage lasting for one hour will be taking place in some British aircraft factories today.

The "strike" will be confined to over 6,000 members of the Association of Supervisory Staffs, Executives and Technicians. (ASSET).

Mr. Clive Jenkins, general secretary of ASSET, has suggested that the money originally earmarked for the now abandoned Q3 ocean liner could be used for supersonic airliner development and that the Government could establish special credit facilities to enable foreign airlines to buy British aircraft.

No-flux aluminium solder

A JAPANESE company claim to have developed a new low temperature aluminium solder, designed and compounded to allow aluminium parts to be joined together without the use of flux.

The new solder, the work of several years of research by Fumio Ueno, president of the Anti-Corrosion Aluminium Solder Metal Co., and his staff, is said to be the only one of its kind.

President Ueno says: "With the invention of this aluminium solder, we have succeeded in showing that the process of soldering aluminium to aluminium can be realised."

Orders received

The new product is called ACAS, anti-corrosion aluminium solder.

Sizeable orders have already been placed by firms like Sony Corporation and Matsushita electric Appliances Co. for use in soldering paper condensers and nichrome wire.

ACAS Metals, Mr. Ueno said, is negotiating with General Motors of the U.S. for shipment of this aluminium solder. Plans are also afoot to build a solder manufacturing factory in France which would contribute much towards the expansion of Japan's technology.

LATE NEWS

TEMple Bar 3422

Council of Industrial Design has appointed Mr. Nigel V. Chapman, Canadian-trained architect, as industrial liaison officer for engineering consumer goods. He will be responsible for Council's contacts with makers of office equipment, motor-cycles, refrigerators, electric switches and many other appliances and fittings.

● from front page

use of oil products among the fuels to be used in direct conversion into electricity.

Guest, Keen & Nettlefold have contributed Mr. R. G. Lewis and Dr. T. Emmerson, head of research for the group, to the board of Energy Conversion. The two members from British Ropes are the chairman, Mr. H. Smith, and Mr. J. R. K. Buckley, the company secretary.

Dr. Frederick E. King, F.R.S., one of British Petroleum's members, is the company's scientific adviser to the research and technical department.

With the massive financial backing and technical manpower resources of the consortium behind Energy Conversion Ltd., and with Shell also in the field, the long-awaited practical development of the fuel cell is likely to move ahead very quickly.

EUROPE'S SATELLITE LAUNCHER

A CONFERENCE to complete arrangements for a European Launcher Development Organisation (ELDO) based on Anglo-French proposals put forward at the Strasbourg Conference earlier this year, opened at Lancaster House, London, last Monday.

The Conference is being attended by representatives from Belgium, Australia, Denmark, Federal Germany, the Netherlands, Italy and Spain, in addition to Britain and France. Observers are also present from Norway, Sweden and Switzerland.

Blue Streak

The original Anglo-French proposals for ELDO envisaged a first five-year programme. The British de Havilland Blue Streak rocket to be used as the first stage of a launcher, a second stage to be developed by France, and the third stage in the development of which Western Germany will take a leading part.

The Strasbourg programme provides for satellites for communications purposes — including TV transmission — weather forecasting, and general scientific research.

Planning group

Britain's Minister of Aviation, Mr. Peter Thorneycroft, addressing the opening session at Lancaster House, said that the delegates must prepare a plan for a European launcher at the earliest practical date.

He emphasised the possible establishment of a planning group to conduct the remainder of the initial programme when it is decided and reminded his listeners that they had "exactly one week" in which to perform their various tasks.

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